```
*****************************************************************
*                                                               *
* CBIOS FOR CP/M VER 2.2 FOR DISK JOCKEY 2D CONTROLLER (ALL     *
* REVS, AND MODELS A & B). HANDLES DISKETTES WITH SECTOR SIZES  *
* OF 128 BYTES SINGLE DENSITY, 256, 512, 1024 BYTES DOUBLE      *
* DENSITY. THERE ARE CONDITIONAL ASSEMBLIES FOR DISKUS HARD     *
* DISK CONTROLLER.                                              *
*                                                               *
* WRITTEN BY BOBBY DALE GIFFORD.                                *
* 12/8/80                                                       *
*                                                               *
* CUSTOMIZED BY JAY O'BRIEN                                     *
* 1/16/82                                                       *
*                                                               *
* DISK MAP OF SECTORS USED BY COLD BOOT, WARM BOOT, FIRMWARE,   *
* AND CP/M:                                                     *
*                                                               *
* TRK Ø SEC  1 = FIRST SECTOR OF COLD BOOT.          E7ØØH      *
*     Ø      2 = COLD BOOT 256.                        8ØH      *
*     Ø      3 = COLD BOOT 512.                        8ØH      *
*     Ø      4 = COLD BOOT 1Ø24.                       8ØH      *
*     Ø      5 = WARM BOOT 256.                        8ØH      *
*     Ø      6 = WARM BOOT 512.                        8ØH      *
*     Ø      7 = WARM BOOT 1Ø24.                       8ØH      *
*     Ø      8 = COLD/WARM BOOT.                    2CØØH       *
*     Ø      9 = FIRMWARE.                          E4ØØH       *
*     Ø     1Ø = FIRMWARE+8ØH.                      E48ØH       *
*     Ø     11 = FIRMWARE+1ØØH                      E5ØØH       *
*     Ø     12 = FIRMWARE+18ØH.                     E58ØH       *
*     Ø     13 = FIRMWARE+2ØØH.                     E6ØØH       *
*     Ø     14 = FIRMWARE+28ØH.                     E68ØH       *
*     Ø     15 = FIRMWARE+3ØØH.                     E7ØØH       *
*     Ø     16 = FIRMWARE+38ØH.                     E78ØH       *
*     Ø     17 = CCP.                               27ØØH       *
*     Ø     1Ø = CCP+8ØH.                           278ØH       *
*     Ø     12 = CCP+1ØØH.                          28ØØH       *
*     Ø     14 = CCP+18ØH.                          288ØH       *
*     Ø     16 = CCP+2ØØH.                          29ØØH       *
*     Ø     18 = CCP+28ØH.                          298ØH       *
*     Ø     2Ø = CCP+3ØØH.                          2A ØØH      *
*     Ø     22 = CCP+38ØH.                          2A8ØH       *
*     Ø     24 = CCP+4ØØH.                          2BØØH       *
*     Ø     26 = CCP+48ØH.                          2B8ØH       *
*     1        = REST OF CP/M.                2CØØH-4FFFH       *
*                                                               *
*****************************************************************

        TITLE   '*** Cbios For CP/M Ver. 2.2 ***'

*****************************************************************
*                                                               *
* THE FOLLOWING REVISION NUMBER IS IN REFERENCE TO THE CP/M     *
* 2.2 CBIOS.                                                    *
*                                                               *
*****************************************************************
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1/16/82
CBIOS5.PRN

CBIOS 5A[illegible] = V10-X vice MSDV
changes in Ltd NO STARTUP

CBIOS5B IS SAME BUT
H/D IS "[illegible]" 9/8/82

~~CBIOSHDS~~
~~Future HDS~~

Working on
Does shift
Problem - see page 10/11

```
001C =          REVNUM  EQU     28              ;CBIOS REVISION NUMBER
0016 =          CPMREV  EQU     22              ;CP/M REVISION NUMBER

                ****************************************************************
                *                                                              *
                * THE FOLLOWING EQUATES SET UP THE RELATIONSHIP BETWEEN THE     *
                * 2D FLOPPIES AND THE HARD DISK CONTROLLERS.                    *
                *                                                              *
                ****************************************************************

0000 =          FIRST   EQU     0               ;0 = FLOPPIES ARE A,B,C,D DRIVES AND
                                                ;       HARD DISK ARE E,F,G,H
                                                ;1 = HARD DISKS ARE A,B,C,D DRIVES AND
                                                ;       FLOPPIES ARE E,F,G,H
0001 =          MAXHD   EQU     1               ;SET TO NUMBER OF HARD DISKS
0002 =          MAXFLOP EQU     2               ;SET TO NUMBER OF FLOPPIES

0001 =          M26     EQU     1               ;SET ONLY ONE OF THESE VARIABLES
0000 =          M20     EQU     0
0000 =          M10     EQU     0

                        IF      M10 OR M20
                SDELAY  EQU     0               ;SOFTWARE HEAD SETTLE DELAY (0 = NO, 1 = YES)
                        ELSE
0001 =          SDELAY  EQU     1
                        ENDIF

001A =          MREV    EQU     26*M26+20*M20+10*M10    ;HARD DISK TYPE
0003 =          LOGDSK  EQU     3*M26+3*M20+2*M10       ;LOGICAL DISKS PER DRIVE
0020 =          HDSPT   EQU     32*M26+21*M20+21*M10    ;SECTORS PER TRACK

                ****************************************************************
                *                                                              *
                * THE FOLLOWING EQUATES RELATE THE THINKER TOYS 2D CONTROLLER.  *
                * IF THE CONTROLLER IS NON STANDARD (0E000H) ONLY THE ORIGIN    *
                * EQUATE NEED BE CHANGED. THIS VERSION OF THE CBIOS WILL WORK   *
                * WITH 2D CONTROLLER BOARDS REV 0, 1, 3, 3.1, 4, MODEL B.       *
                *                                                              *
                ****************************************************************

                        IF      MAXFLOP NE 0    ;INCLUDE DISCUS 2D ?
E000 =          ORIGIN  EQU     0E000H
E400 =          DJRAM   EQU     ORIGIN+400H     ;DISK JOCKEY 2D RAM ADDRESS
E400 =          DJBOOT  EQU     DJRAM           ;DISK JOCKEY 2D INITIALIZATION
E003 =          DJCIN   EQU     ORIGIN+3H       ;DISK JOCKEY 2D CHARACTER INPUT ROUTINE
E006 =          DJCOUT  EQU     ORIGIN+6H       ;DISK JOCKEY 2D CHARACTER OUTPUT ROUTINE
E409 =          DJHOME  EQU     DJRAM+9H        ;DISK JOCKEY 2D TRACK ZERO SEEK
E40C =          DJTRK   EQU     DJRAM+0CH       ;DISK JOCKEY 2D TRACK SEEK ROUTINE
E40F =          DJSEC   EQU     DJRAM+0FH       ;DISK JOCKEY 2D SET SECTOR ROUTINE
E412 =          DJDMA   EQU     DJRAM+012H      ;DISK JOCKEY 2D SET DMA ADDRESS
E415 =          DJREAD  EQU     DJRAM+15H       ;DISK JOCKEY 2D READ ROUTINE
E418 =          DJWRITE EQU     DJRAM+18H       ;DISK JOCKEY 2D WRITE ROUTINE
E41B =          DJSEL   EQU     DJRAM+1BH       ;DISK JOCKEY 2D SELECT DRIVE ROUTINE
E021 =          DJTSTAT EQU     ORIGIN+21H      ;DISK JOCKEY 2D TERMINAL STATUS ROUTINE
```

```
E427 =          DJSTAT  EQU     DJRAM+27H       ;DISK JOCKEY 2D STATUS ROUTINE
E42A =          DJERR   EQU     DJRAM+2AH       ;DISK JOCKEY 2D ERROR, FLASH LED
E42D =          DJDEN   EQU     DJRAM+2DH       ;DISK JOCKEY 2D SET DENSITY ROUTINE
E430 =          DJSIDE  EQU     DJRAM+30H       ;DISK JOCKEY 2D SET SIDE ROUTINE
0008 =          DBLSID  EQU     8               ;SIDE BIT FROM CONTROLLER
                ENDIF

                ;*****************************************************************
                ;*                                                               *
                ;* THE FOLLOWING EQUATES ARE FOR THE DISKUS HARD DISK WANTED.    *
                ;*                                                               *
                ;*****************************************************************

                IF      MAXHD NE 0      ;WANT HARD DISK INCLUDED ?
0050 =          HDORG   EQU     50H             ;HARD DISK CONTROLLER ORIGIN
0050 =          HDSTAT  EQU     HDORG           ;HARD DISK STATUS
0050 =          HDCNTL  EQU     HDORG           ;HARD DISK CONTROL
0053 =          HDDATA  EQU     HDORG+3         ;HARD DISK DATA
0052 =          HDFUNC  EQU     HDORG+2         ;HARD DISK FUNCTION
0051 =          HDCMND  EQU     HDORG+1         ;HARD DISK COMMAND
0051 =          HDRESLT EQU     HDORG+1         ;HARD DISK RESULT
0002 =          RETRY   EQU     2               ;RETRY BIT OF RESULT
0001 =          TKZERO  EQU     1               ;TRACK ZERO BIT OF STATUS
0002 =          OPDONE  EQU     2               ;OPERACTION DONE BIT OF STATUS
0004 =          COMPLT  EQU     4               ;COMPLETE BIT OF STATUS
0008 =          TMOUT   EQU     8               ;TIME OUT BIT OF STATUS
0010 =          WFAULT  EQU     10H             ;WRITE FAULT BIT OF STATUS
0020 =          DRVRDY  EQU     20H             ;DRIVE READY BIT OF STATUS
0040 =          INDEX   EQU     40H             ;INDEX BIT OF STATUS
0004 =          PSTEP   EQU     4               ;STEP BIT OF FUNCTION
00FB =          NSTEP   EQU     0FBH            ;STEP BIT MASK OF FUNCTION
0004 =          HDRLEN  EQU     4               ;SECTOR HEADER LENGTH
0200 =          SECLEN  EQU     512             ;SECTOR DATA LENGTH
000F =          WENABL  EQU     0FH             ;WRITE ENABLE
000B =          WRESET  EQU     0BH             ;WRITE RESET OF FUNCTION
0005 =          SCENBL  EQU     5               ;CONTROLLER CONTROL
0007 =          DSKCLK  EQU     7               ;DISK CLOCK FOR CONTROL
00F7 =          MDIR    EQU     0F7H            ;DIRECTION MASK FOR FUNCTION
00FC =          NULL    EQU     0FCH            ;NULL COMMAND
0000 =          IDBUFF  EQU     0               ;INITIALIZE DATA COMMAND
0008 =          ISBUFF  EQU     8               ;INITIALIZE HEADER COMMAND
0001 =          RSECT   EQU     1               ;READ SECTOR COMMAND
0005 =          WSECT   EQU     5               ;WRITE SECTOR COMMAND
                ENDIF

                ;*****************************************************************
                ;*                                                               *
                ;* CP/M SYSTEM EQUATES. IF RECONFIGURATION OF THE CP/M SYSTEM    *
                ;* IS BEING DONE, THE CHANGES CAN BE MADE TO THE FOLLOWING       *
                ;* EQUATES.                                                      *
                ;*                                                               *
                ;*****************************************************************

0038 =          MSIZE   EQU     56              ;MEMORY SIZE OF TARGET CP/M
9000 =          BIAS    EQU     (MSIZE-20)*1024 ;MEMORY OFFSET FROM 20K SYSTEM
B700 =          CCP     EQU     2700H+BIAS      ;CONSOLE COMMAND PROCESSOR
```

```
BF00 =          BDOS    EQU     CCP+800H        ;BDOS ADDRESS
CD00 =          BIOS    EQU     CCP+1600H       ;CBIOS ADDRESS
5A00 =          OFFSETC EQU     2700H-BIOS      ;OFFSET FOR SYSGEN
0004 =          CDISK   EQU     4               ;ADDRESS OF LAST LOGGED DISK
0080 =          BUFF    EQU     80H             ;DEFAULT BUFFER ADDRESS
0100 =          TPA     EQU     100H            ;TRANSIENT MEMORY
00C0 =          INTIOBY EQU     192             ;INITIAL IOBYTE
0003 =          IOBYTE  EQU     3               ;IOBYTE LOCATION
0000 =          WBOT    EQU     0               ;WARM BOOT JUMP ADDRESS
0005 =          ENTRY   EQU     5               ;BDOS ENTRY JUMP ADDRESS

                ;*****************************************************************
                ;*                                                               *
                ;* THE FOLLOWING ARE INTERNAL CBIOS EQUATES. MOST ARE MISC.      *
                ;* CONSTANTS.                                                    *
                ;*                                                               *
                ;*****************************************************************

000A =          RETRIES EQU     10              ;MAX RETRIES ON DISK I/O BEFORE ERROR
000D =          ACR     EQU     0DH             ;A CARRIAGE RETURN
000A =          ALF     EQU     0AH             ;A LINE FEED
0019 =          CLEAR   EQU     19H             ;CLEAR SCREEN FOR MSDV
0003 =          AETX    EQU     3               ;ETX CHARACTER
0006 =          AACK    EQU     6               ;ACK CHARACTER
E800 =          MSDV    EQU     0E800H          ;VIDEO DRIVER FOR MSDV-100 VIDEO BOARD

                ;*****************************************************************
                ;*                                                               *
                ;* THE JUMP TABLE BELOW MUST REMAIN IN THE SAME ORDER, THE       *
                ;* ROUTINES MAY BE CHANGED, BUT THE FUNCTION EXECUTED MUST BE    *
                ;* THE SAME.                                                     *
                ;*                                                               *
                ;*****************************************************************

CD00                    ORG     BIOS            ;CBIOS STARTING ADDRESS

CD00 C3D2D5             JMP     CBOOT           ;COLD BOOT ENTRY POINT
CD03 C3B4CE     WBOOTE  JMP     WBOOT           ;WARM BOOT ENTRY POINT
CD06 C336CD             JMP     CONST           ;CONSOLE STATUS ROUTINE
CD09 C342CD             JMP     CONIN           ;CONSOLE INPUT
CD0C C357CD     COUT    JMP     CONOUT          ;CONSOLE OUTPUT
CD0F C377CD             JMP     LIST            ;LIST DEVICE OUTPUT
CD12 C36CCD             JMP     PUNCH           ;PUNCH DEVICE OUTPUT
CD15 C362CD             JMP     READER          ;READER DEVICE INPUT
CD18 C349CF             JMP     HOME            ;HOME DRIVE
CD1B C38BCF             JMP     SETDRV          ;SELECT DISK
CD1E C34BCF             JMP     SETTRK          ;SET TRACK
CD21 C33DCF             JMP     SETSEC          ;SET SECTOR
CD24 C343CF             JMP     SETDMA          ;SET DMA ADDRESS
CD27 C391D0             JMP     READ            ;READ THE DISK
CD2A C38AD0             JMP     WRITE           ;WRITE THE DISK
CD2D C382CD             JMP     LISTST          ;LIST DEVICE STATUS
CD30 C350CF             JMP     SECTRAN         ;SECTOR TRANSLATION

                        IF      MAXFLOP NE 0
CD33 C31BE4     DJDRV   JMP     DJSEL           ;HOOK FOR SINGLE.COM PROGRAM
```

```
                        ELSE
                        JMP     DONOP
                        ENDIF

                ;*****************************************************************
                ;*                                                               *
                ;* TERMINAL DRIVER ROUTINES. IOBYTE IS INITIALIZED BY THE COLD   *
                ;* BOOT ROUTINE, TO MODIFY, CHANGE THE "INTIOBY" EQUATE. THE     *
                ;* I/O ROUTINES THAT FOLLOW ALL WORK EXACTLY THE SAME WAY. USING *
                ;* IOBYTE, THEY OBTAIN THE ADDRESS TO JUMP TO IN ORDER TO EXECUTE*
                ;* THE DESIRED FUNCTION. THERE IS A TABLE WITH FOUR ENTRIES FOR  *
                ;* EACH OF THE POSSIBLE ASSIGNMENTS FOR EACH DEVICE. TO MODIFY   *
                ;* THE I/O ROUTINES FOR A DIFFERENT I/O CONFIGURATION, JUST      *
                ;* CHANGE THE ENTRIES IN THE TABLES.                             *
                ;*                                                               *
                ;*****************************************************************

E003 =          CITTY   EQU     DJCIN           ;INPUT FROM THE DISK JOCKEY 2D
E006 =          COTTY   EQU     DJCOUT          ;OUTPUT TO THE DISK JOCKEY 2D

                ;*****************************************************************
                ;*                                                               *
                ;* CONST: GET THE STATUS FOR THE CURRENTLY ASSIGNED CONSOLE      *
                ;*        DEVICE. THE CONSOLE DEVICE CAN BE GOTTEN FROM IOBYTE,  *
                ;*        THEN A JUMP TO THE CORRECT CONSOLE STATUS ROUTINE IS   *
                ;*        PERFORMED.                                             *
                ;*                                                               *
                ;*****************************************************************

CD36 21B0CD     CONST   LXI     H,CSTBLE        ;BEGINNING OF JUMP TABLE
CD39 C348CD             JMP     CONIN1          ;SELECT CORRECT JUMP

                ;*****************************************************************
                ;*                                                               *
                ;* CSREADER: IF THE CONSOLE IS ASSIGNED TO THE READER THEN A     *
                ;*           JUMP WILL BE MADE HERE, WHERE ANOTHER JUMP WILL     *
                ;*           OCCUR TO THE CORRECT READER STATUS.                 *
                ;*                                                               *
                ;*****************************************************************

CD3C 21B8CD     CSREADR LXI     H,CSRTBLE       ;BEGINNING OF READER STATUS TABLE
CD3F C365CD             JMP     READERA

                ;*****************************************************************
                ;*                                                               *
                ;* CONIN: TAKE THE CORRECT JUMP FOR THE CONSOLE INPUT ROUTINE.   *
                ;*        THE JUMP IS BASED ON THE TWO LEAST SIGNIFICANT BITS OF *
                ;*        IOBYTE.                                                *
                ;*                                                               *
                ;*****************************************************************

CD42 CD04D1     CONIN   CALL    FLUSH           ;FLUSH THE DISK BUFFER
CD45 2188CD             LXI     H,CITBLE        ;BEGINNING OF CHARACTER INPUT TABLE

                ;
                ; ENTRY AT CONIN1 WILL DECODE THE TWO LEAST SIGNIFICANT BITS
```

```
                * OF IOBYTE. THIS IS USED BY CONIN,CONOUT, AND CONST.
                *
CD48 3A0300     CONIN1  LDA     IOBYTE
CD4B 17                 RAL
                *
                * ENTRY AT SELDEV WILL FORM AN OFFSET INTO THE TABLE POINTED
                * TO BY H&L AND THEN PICK UP THE ADDRESS AND JUMP THERE.
                *
CD4C E606       SELDEV  ANI     6H              ;STRIP OFF UNWANTED BITS
CD4E 1600               MVI     D,0             ;FORM OFFSET
CD50 5F                 MOV     E,A
CD51 19                 DAD     D               ;ADD OFFSET
CD52 7E                 MOV     A,M             ;PICK UP HIGH BYTE
CD53 23                 INX     H
CD54 66                 MOV     H,M             ;PICK UP LOW BYTE
CD55 6F                 MOV     L,A             ;FORM ADDRESS
CD56 E9                 PCHL                    ;GO THERE !
                ****************************************************************
                *                                                              *
                * CONOUT: TAKE THE PROPER BRANCH ADDRESS BASED ON THE TWO LEAST *
                *         SIGNIFICANT BITS OF IOBYTE.                          *
                *                                                              *
                ****************************************************************
CD57 C5         CONOUT  PUSH    B               ;SAVE THE CHARACTER
CD58 CD04D1             CALL    FLUSH           ;FLUSH THE DISK BUFFER
CD5B C1                 POP     B               ;RESTORE THE CHARACTER
CD5C 2190CD             LXI     H,COTBLE        ;BEGINNING OF THE CHARACTER OUT TABLE
CD5F C348CD             JMP     CONIN1          ;DO THE DECODE
                ****************************************************************
                *                                                              *
                * READER: SELECT THE CORRECT READER DEVICE FOR INPUT. THE      *
                *         READER IS SELECTED FROM BITS 2 AND 3 OF IOBYTE.      *
                *                                                              *
                ****************************************************************
CD62 21A8CD     READER  LXI     H,RTBLE         ;BEGINNING OF READER INPUT TABLE
                *
                * ENTRY AT READERA WILL DECODE BITS 2 & 3 OF IOBYTE, USED
                * BY CSREADER.
                *
CD65 3A0300     READERA LDA     IOBYTE
                *
                * ENTRY AT READER1 WILL SHIFT THE BITS INTO POSITION, USED
                * BY LIST AND PUNCH.
                *
CD68 1F         READR1  RAR
```

```
CD69 C34CCD             JMP     SELDEV

                ;*****************************************************************
                ;*                                                               *
                ;* PUNCH: SELECT THE CORRECT PUNCH DEVICE. THE SELECTION COMES   *
                ;*        FROM BITS 4&5 OF IOBYTE.                               *
                ;*                                                               *
                ;*****************************************************************

CD6C 21A0CD     PUNCH   LXI     H,PTBLE         ;BEGINNING OF PUNCH TABLE
CD6F 3A0300             LDA     IOBYTE

                ;
                ; ENTRY AT PNCH1 ROTATES BITS A LITTLE MORE IN PREP FOR
                ; SELDEV, USED BY LIST.
                ;

CD72 1F         PNCH1   RAR
CD73 1F                 RAR
CD74 C368CD             JMP     READR1

                ;*****************************************************************
                ;*                                                               *
                ;* LIST: SELECT A LIST DEVICE BASED ON BITS 6&7 OF IOBYTE        *
                ;*                                                               *
                ;*****************************************************************

CD77 2198CD     LIST    LXI     H,LTBLE         ;BEGINNING OF THE LIST DEVICE ROUTINES
CD7A 3A0300     LIST1   LDA     IOBYTE
CD7D 1F                 RAR
CD7E 1F                 RAR
CD7F C372CD             JMP     PNCH1

                ;*****************************************************************
                ;*                                                               *
                ;* LISTST: GET THE STATUS OF THE CURRENTLY ASSIGNED LIST DEVICE  *
                ;*                                                               *
                ;*****************************************************************

CD82 21C0CD     LISTST  LXI     H,LSTBLE        ;BEGINNING OF THE LIST DEVICE STATUS
CD85 C37ACD             JMP     LIST1

                ;*****************************************************************
                ;*                                                               *
                ;* IF CUSTOMIZING I/O ROUTINES IS BEING PERFORMED, THE TABLE     *
                ;* BELOW SHOULD BE MODIFIED TO REFLECT THE CHANGES. ALL I/O      *
                ;* DEVICES ARE DECODED OUT OF IOBYTE AND THE JUMP IS TAKEN FROM  *
                ;* THE FOLLOWING TABLES.                                         *
                ;*                                                               *
                ;*****************************************************************

                ;
                ; CONSOLE INPUT TABLE
                ;

CD88 F6CD       CITBLE  DW      CIUC1           ;INPUT FROM USER CONSOLE 1 (CURRENTLY
```

```
                                        ;       SWBD PARALLEL PORT 4)
CD8A ØBCE               DW      CICRT   ;INPUT FROM CRT (CURRENTLY SWITCHBOARD
                                        ;       SERIAL PORT 1)
CD8C 62CD               DW      READER  ;INPUT FROM READER (DEPENDS ON READER
                                        ;       SELECTION)
CD8E Ø3EØ               DW      CITTY   ;INPUT FROM TTY (CURRENTLY INPUT FROM
                                        ;       DISK JOCKEY 2D)
                *
                * CONSOLE OUTPUT TABLE
                *
CD9Ø C8CD       COTBLE  DW      COCRT   ;OUTPUT TO CRT (MSDV)
                                        ;
CD92 C8CD               DW      COCRT   ;OUTPUT TO CRT (MSDV)
                                        ;
CD94 77CD               DW      LIST    ;OUTPUT TO LIST DEVICE (DEPENDS ON
                                        ;       BITS 6&7 OF IOBYTE)
CD96 Ø6EØ               DW      COTTY   ;OUTPUT TO TTY (CURRENTLY OUTPUT TO
                                        ;       DISK JOCKEY 2D)
                *
                * LIST DEVICE TABLE
                *
CD98 Ø6EØ       LTBLE   DW      COTTY   ;OUTPUT TO TTY (CURRENTLY ASSIGNED
                                        ;       BY INTIOBY,OUTPUT TO 2D)
CD9A 3ECE               DW      COPTR   ;OUTPUT TO PRINTER
                                        ;
CD9C CCCD               DW      COLPT   ;OUTPUT TO LINE PRINTER (CURRENTLY
                                        ;       SWITCHBOARD SERIAL PORT 1)
CD9E D7CD               DW      COUL1   ;OUTPUT TO USER LINE PRINTER 1 (CURRENTLY
                                        ;       SWITCHBOARD SERIAL PORT 1)
                *
                * PUNCH DEVICE TABLE
                *
CDAØ Ø6EØ       PTBLE   DW      COTTY   ;OUTPUT TO THE TTY (CURRENTLY ASSIGNED
                                        ;       BY INTIOBY,OUTPUT TO 2D)
CDA2 3ECE               DW      COPTR   ;OUTPUT TO PRINTER
                                        ;
CDA4 CCCD               DW      COUP1   ;OUTPUT TO USER PUNCH 1 (CURRENTLY
                                        ;       SWITCHBOARD SERIAL PORT 1)
CDA6 CCCD               DW      COUP2   ;OUTPUT TO USER PUNCH 2 (CURRNTLLY
                                        ;       SWITCHBOARD SERIAL PORT 1)
                *
                * READER DEVICE INPUT TABLE
                *
CDA8 Ø3EØ       RTBLE   DW      CITTY   ;INPUT FROM TTY (CURRENTLY ASSIGNED
                                        ;       BY INTIOBY, INPUT FROM 2D)
CDAA ØBCE               DW      CIPTR   ;INPUT FROM PAPER TAPE READER (CURRENTLY
                                        ;       SWITCHBOARD SERIAL PORT 1)
CDAC ØBCE               DW      CIUR1   ;INPUT FROM USER READER 1 (CURRENTLY
                                        ;       SWITCHBOARD SERIAL PORT 1)
```

```
CDAE ØBCE               DW      CIUR2           ;INPUT FROM USER READER 2 (CURRENTLY
                                                ;       SWITCHBOARD SERIAL PORT 1)

                *
                * CONSOLE STATUS TABLE
                *

CDBØ Ø2CE       CSTBLE  DW      CSUC1           ;STATUS FROM SWBD PARALLEL PORT 4, AS
                                                ;       READ FROM ATTN BIT Ø)
CDB2 1FCE               DW      CSCRT           ;STATUS FROM CRT (CURRENTLY SWITCHBOARD
                                                ;       SERIAL PORT 1)
CDB4 3CCD               DW      CSREADR         ;STATUS FROM READER (DEPENDS ON READER DEVICE )
                                                ;
CDB6 17CE               DW      CSTTY           ;STATUS OF TTY (CURRENTLY STSTUS FROM
                                                ;       DISK JOCKEY 2D)
                *
                * STATUS FROM READER DEVICE
                *

CDB8 17CE       CSRTBLE DW      CSTTY           ;STATUS FROM TTY (CURRENTLY ASSIGNED
                                                ;       BY INTIOBY, STATUS OF 2D)
CDBA 1FCE               DW      CSPTR           ;STATUS FROM PAPER TAPE READER (CURRENTLY
                                                ;       SWITCHBOARD SERIAL PORT 1)
CDBC 1FCE               DW      CSUR1           ;STATUS FROM USER READER 1 (CURRENTLY
                                                ;       SWITCHBOARD SERIAL PORT 1)
CDBE 1FCE               DW      CSUR2           ;STATUS OF USER READER 2 (CURRENTLY
                                                ;       SWITCHBOARD SERIAL PORT 1)

                *
                * STATUS FROM LIST DEVICE
                *

CDCØ 2DCE       LSTBLE  DW      READY           ;CONSOLE ALWAYS READY
CDC2 2DCE               DW      READY           ;GET LIST STATUS
CDC4 28CE               DW      LSLPT
CDC6 28CE               DW      LSLPT

                ****************************************************************
                *                                                              *
                * ROUTINES FOR MY SYSTEM.  J. J. O'BRIEN                       *
                *                                                              *
                ****************************************************************

                *
                * MSDV VIDEO DRIVER
                *

CDC8 79         COCRT   MOV     A,C             ;MSDV WANTS DATA IN A
CDC9 C300E8             JMP     MSDV            ;GO THERE


                *
                ****************************************************************
                *                                                              *
                * THE FOLLOWING EQUATES SET OUTPUT DEVICE TO OUTPUT TO THE     *
                * SWITCHBOARD SERIAL PORT 1.                                   *
```

```
                ********************************************************************
                *                                                                  *
                ********************************************************************

CDCC =          COPTP   EQU     $               ;OUTPUT FROM PAPER TAPE PUNCH
CDCC =          COUP1   EQU     $               ;OUTPUT FROM USER PUNCH 1
CDCC =          COUP2   EQU     $               ;OUTPUT FROM USER PUNCH 2
CDCC DB02       COLPT   IN      2               ;OUTPUT FROM LINE PRINTER,GET STATUS
CDCE E680               ANI     80H             ;WAIT UNTIL OK TO SEND
CDD0 CACCCD             JZ      COLPT
CDD3 79                 MOV     A,C             ;OUTPUT THE CHARACTER
CDD4 D301               OUT     1
CDD6 C9                 RET

                ********************************************************************
                *                                                                  *
                * CUSTOM I/O PRINTER DRIVER FOR DIABLO PRINTER WITH 1200 BAUD      *
                * ETX/ACK HANDSHAKE.                                               *
                *                                                                  *
                ********************************************************************

CDD7 CDCCCD     COUL1   CALL    COLPT           ;OUTPUT THE CHARACTER
CDDA 3AF5CD             LDA     COUNT
CDDD 3D                 DCR     A
CDDE 32F5CD             STA     COUNT
CDE1 C0                 RNZ
CDE2 3E4E               MVI     A,78
CDE4 32F5CD             STA     COUNT
CDE7 0E03               MVI     C,AETX
CDE9 CDCCCD             CALL    COLPT
CDEC CD0BCE     PWAIT   CALL    CIPTR
CDEF FE06               CPI     AACK
CDF1 C2ECCD             JNZ     PWAIT
CDF4 C9                 RET

CDF5 32         COUNT   DB      50

                ********************************************************************
                *                                                                  *
                * THE FOLLOWING EQUATES SET THE INPUT TO COME FROM THE SWBD        *
                * PARALLEL PORT 4, WITH STATUS ON ATTENTION PORT BIT 0.            *
                *                                                                  *
                ********************************************************************

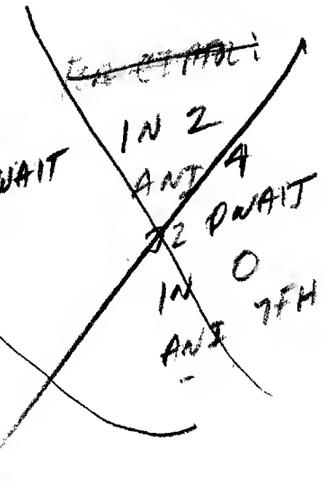
CDF6 DB03       CIUC1   IN      3               ;GET ATTENTION BYTE
CDF8 E601               ANI     1               ;GET BIT 0 ONLY
CDFA CAF6CD             JZ      CIUC1           ;WAIT FOR CHARACTER
CDFD DB04               IN      4               ;GET CHARACTER
CDFF E67F               ANI     7FH             ;STRIP OFF THE PARITY
CE01 C9                 RET

CE02 DB03       CSUC1   IN      3               ;GET ATTENTION BYTE
CE04 E601               ANI     1               ;GET BIT 0 ONLY
CE06 EE01               XRI     1               ;CHANGE POLARITY
CE08 C31ACE             JMP     STAT            ;RETURN PROPER INDICATION

                ********************************************************************
```

PORT 2 80H BIT = PORT 1 XMT STATUS

PORT 1 TO DIABLO



7 NOP's NO Here!

```
                ;*****************************************************************
                ;*                                                               *
                ;* THE FOLLOWING EQUATES SET THE INPUT FROM THE DEVICES TO COME  *
                ;* FROM THE SWITCHBOARD SERIAL PORT 1.                           *
                ;*                                                               *
                ;*****************************************************************

CE0B =          CICRT   EQU     $               ;INPUT FROM CRT
CE0B =          CIUR1   EQU     $               ;INPUT FROM USER READER 1
CE0B =          CIUR2   EQU     $               ;INPUT FROM USER READER 2
CE0B DB02       CIPTR   IN      2               ;INPUT FROM PAPER TAPE READER, GET STATUS
CE0D E640               ANI     40H             ;WAIT FOR CHARACTER
CE0F CA0BCE             JZ      CIPTR
CE12 DB01               IN      1
CE14 E67F               ANI     7FH             ;STRIP OFF THE PARITY
CE16 C9                 RET

                ;*****************************************************************
                ;*                                                               *
                ;* CONSOLE STATUS ROUTINES, TEST IF A CHARACTER HAS ARRIVED.     *
                ;*                                                               *
                ;*****************************************************************

CE17 CD21E0     CSTTY   CALL    DJTSTAT         ;STATUS FROM DISK JOCKEY 2D
CE1A 3E00       STAT    MVI     A,0             ;PREP FOR ZERO RETURN
CE1C C0                 RNZ                     ;NOTHING FOUND
CE1D 3D                 DCR     A               ;RETURN WITH 0FFH
CE1E C9                 RET

                ;*****************************************************************
                ;*                                                               *
                ;* THE FOLLOWING EQUATES CAUSE THE DEVICES TO GET STATUS FROM    *
                ;* THE SWITCHBOARD SERIAL PORT 1.                                *
                ;*                                                               *
                ;*****************************************************************

CE1F =          CSUR1   EQU     $               ;STATUS OF USER READER 1
CE1F =          CSUR2   EQU     $               ;STATUS OF USER READER 2
CE1F =          CSPTR   EQU     $               ;STATUS OF PAPER TAPE READER
CE25 ->         CE1F DB02       CSCRT   IN      2               ;STATUS FROM CRT, GET STATUS
(WITH 6 NOPS)   CE21 E640               ANI     40H             ;STRIP OF DATA READY BIT
                CE23 EE40               XRI     40H             ;MAKE CORRECT POLARITY
                CE25 C31ACE             JMP     STAT            ;RETURN PROPER INDICATION

                ;*****************************************************************
                ;*                                                               *
                ;* LIST DEVICE STATUS ROUTINES.                                  *
                ;*                                                               *
                ;*****************************************************************

CE28 DB02       LSLPT   IN      2               ;ALL OTHER DEVICES WAIT
CE2A E680               ANI     80H
CE2C C8                 RZ
CE2D 3EFF       READY   MVI     A,0FFH
CE2F C9                 RET

                ;*****************************************************************
```

KYBD INPUT PORT 1

TOP'S NO here!

7 NG here, TRY 1-NOP OK
4 NOP'S OK
6 NOP'S OK!
7 NG

OK here! 6 NOP'S OK

OK here! PORT 2 40H BIT = INPUT, SWBD BASE +1 (PORT 1)

7 NOP'S OK here!

REC STATUS

7 NOP'S OK here

```
                ;*****************************************************************
                ;*                                                               *
                ;* THIS INITIALLIZING ROUTINE SAMPLES BIT Ø OF SWBD PORT 7 TO    *
                ;* DETERMINE IF THE KEYBOARD IS PLUGGED IN.  IF THE KEYBOARD IS  *
                ;* PLUGGED IN, THE LSB RETURNS A Ø. OTHERWISE, IT IS A 1.        *
                ;* THIS 1 IS ADDED TO IOBYTE TO CHANGE THE CONSOLE INPUT FROM    *
                ;* THE SWBD PARALLEL PORT 4 (THE KEYBOARD) TO THE SWBD SERIAL    *
                ;* PORT THAT RECEIVES RS232 DATA FROM THE RS232 TERMINAL.        *
                ;*                                                               *
                ;*****************************************************************

CE3Ø ØE19       TINIT   MVI     C,CLEAR         ;INITIALIZE THE TERMINAL ROUTINE
CE32 DBØ7               IN      7               ;GET KEYBOARD INTERLOCK BYTE
CE34 E6Ø1               ANI     1               ;GET BIT 1 ONLY
CE36 C6CØ               ADI     INTIOBY         ;ADD INTIOBY TO KEYBOARD BIT
CE38 32Ø3ØØ             STA     IOBYTE          ;INITIALIZE IOBYTE
CE3B C3ØCCD             JMP     COUT

                ;*****************************************************************
                ;*                                                               *
                ;* ROUTINE FOR OKIDATA PRINTER                                   *
                ;* PRINTER IS ON PORT Ø WITH PRINTER READY ON PORT 5 BIT 1        *
                ;*                                                               *
                ;*****************************************************************

CE3E DBØ2       COPTR   IN      2               ;INPUT FROM PORT 2
CE4Ø E6Ø8               ANI     8               ;WAIT UNTIL OK TO SEND
CE42 CA3ECE             JZ      COPTR
CE45 DBØ5       COPTR1  IN      5               ;BUFFER FULL?
CE47 E6Ø1               ANI     1
CE49 CA45CE             JZ      COPTR1          ;WAIT UNTIL PRINTER READY
CE4C 79                 MOV     A,C             ;OUTPUT THE CHARACTER
CE4D D3ØØ               OUT     Ø
CE4F C9                 RET

                ;*****************************************************************
                ;*                                                               *
                ;* GOCPM IS THE ENTRY POINT FROM COLD BOOTS, AND WARM BOOTS. IT   *
                ;* INITIALIZES SOME OF THE LOCATIONS IN PAGE Ø, AND SETS UP THE   *
                ;* INITIAL DMA ADDRESS (8ØH).                                    *
                ;*                                                               *
                ;*****************************************************************

CE5Ø 218ØØØ     GOCPM   LXI     H,BUFF          ;SET UP INITIAL DMA ADDRESS
CE53 CD43CF             CALL    SETDMA
CE56 3EC3               MVI     A,(JMP)         ;INITIALIZE JUMP TO WARM BOOT
CE58 32ØØØØ             STA     WBOT
CE5B 32Ø5ØØ             STA     ENTRY           ;INITIALIZE JUMP TO BDOS
CE5E 21Ø3CD             LXI     H,WBOOTE        ;ADDRESS IN WARM BOOT JUMP
CE61 22Ø1ØØ             SHLD    WBOT+1
CE64 21Ø6BF             LXI     H,BDOS+6        ;ADDRESS IN BDOS JUMP
CE67 22Ø6ØØ             SHLD    ENTRY+1
CE6A AF                 XRA     A               ;A <- Ø
CE6B 32FDD4             STA     BUFSEC          ;DISK JOCKEY BUFFER EMPTY
CE6E 32Ø5D1             STA     BUFWRTN         ;SET BUFFER NOT DIRTY FLAG
CE71 3AØ4ØØ             LDA     CDISK           ;JUMP TO CP/M WITH CURRENTLY SELECTED DISK IN C
CE74 4F                 MOV     C,A
```

CE3E

```
CP/M MACRO ASSEM 2.0     #013     *** Cbios For CP/M Ver. 2.2 ***

 CE75 3AA2CE             LDA      CWFLG
 CE78 A7                 ANA      A
 CE79 11A4CE             LXI      D,COLDBEG        ;BEGINNING OF INITIAL COMMAND
 CE7C 3E0F               MVI      A,COLDEND-COLDBEG+1 ;LENGTH OF COMMAND
 CE7E CA86CE             JZ       CLDCMND
 CE81 11B3CE             LXI      D,WARMBEG
 CE84 3E01               MVI      A,WARMEND-WARMBEG+1
 CE86 2108B7    CLDCMND  LXI      H,CCP+8          ;COMMAND BUFFER
 CE89 3207B7             STA      CCP+7
 CE8C 47                 MOV      B,A
 CE8D CDCCD1             CALL     MOVLOP
 CE90 3AA2CE             LDA      CWFLG
 CE93 A7                 ANA      A
 CE94 3AA3CE             LDA      AUTOFLG
 CE97 CA9BCE             JZ       CLDBOT
 CE9A 1F                 RAR
 CE9B 1F        CLDBOT   RAR
 CE9C DA00B7             JC       CCP
 CE9F C303B7             JMP      CCP+3            ;ENTER CP/M

 CEA2 00        CWFLG    DB       0                ;COLD/WARM BOOT FLAG

                ********************************************************************
                *                                                                  *
                * THE FOLLOWING BYTE DETERMINES IF AN INITIAL COMMAND IS TO BE     *
                * GIVEN TO CP/M ON WARM OR COLD BOOTS. THE VALUE OF THE BYTE IS    *
                * USED TO GIVE THE COMMAND TO CP/M:                                *
                *                                                                  *
                * 0 = NEVER GIVE COMMAND.                                          *
                * 1 = GIVE COMMAND ON COLD BOOTS ONLY.                             *
                * 2 = GIVE THE COMMAND ON WARM BOOTS ONLY.                         *
                * 3 = GIVE THE COMMAND ON WARM AND COLD BOOTS.                     *
                *                                                                  *
                ********************************************************************

CEA3 01         AUTOFLG  DB       1               ;AUTO COMMAND FEATURE

                ********************************************************************
                *                                                                  *
                * IF THERE IS A COMMAND INSERTED HERE, IT WILL BE GIVEN IF THE     *
                * AUTO FEATURE IS ENABLED.                                         *
                *       FOR EXAMPLE:                                               *
                *                                                                  *
                *       COLDBEG DB      'MBASIC MYPROG'                            *
                *       COLDEND DB      0                                          *
                *                                                                  *
                * WILL EXECUTE MICROSOFT BASIC, AND MBASIC WILL EXECUTE THE        *
                * "MYPROG" BASIC PROGRAM.                                          *
                *                                                                  *
                ********************************************************************

CEA4 5355424D49COLDBEG DB       'SUBMIT STARTUP';COLD BOOT COMMAND
CEB2 00        COLDEND  DB      0
                WARMBEG  DB      ''              ;WARM BOOT COMMAND GOES HERE
CEB3 00        WARMEND  DB      0
```

```
                ;*****************************************************************
                ;*                                                               *
                ;* WBOOT LOADS IN ALL OF CP/M EXCEPT THE CBIOS, THEN INITIALIZES *
                ;* SYSTEM PARAMETERS AS IN COLD BOOT. SEE THE COLD BOOT LOADER   *
                ;* LISTING FOR EXACTLY WHAT HAPPENS DURING WARM AND COLD BOOTS.  *
                ;*                                                               *
                ;*****************************************************************

CEB4 310001     WBOOT   LXI     SP,TPA          ;SET UP STACK POINTER
CEB7 3E01               MVI     A,1
CEB8 =          WFLG    EQU     $-1             ;TEST IF BEGINNING OR
CEB9 A7                 ANA     A               ;       ENDING A WARM BOOT
CEBA 3E01               MVI     A,1
CEBC 32B8CE             STA     WFLG
CEBF 32A2CE             STA     CWFLG           ;SET COLD/WARM BOOT FLAG
CEC2 CA50CE             JZ      GOCPM
CEC5 AF                 XRA     A
CEC6 32B8CE             STA     WFLG
CEC9 4F                 MOV     C,A

                        IF      (MAXHD NE Ø) AND FIRST  ;SUPPLY WARM BOOT FROM HARD DISK ?
                        LXI     H,CCP-200H      ;INITIAL DMA ADDRESS
                        PUSH    H
                        STA     HEAD
                        MVI     A,4
                        PUSH    PSW             ;SAVE FIRST SECTOR
                        CALL    HDDRV           ;SELECT DRIVE A
                        MVI     C,Ø
                        CALL    HDTRK           ;HOME THE DRIVE
                WARMLOD POP     PSW             ;RESTORE SECTOR
                        POP     H               ;RESTORE DMA ADDRESS
                        INR     A
                        STA     HDSECTR
                        CPI     16              ;PAST BDOS ?
                        JZ      WBOOT           ;YES, ALL DONE
                        INR     H               ;UPDATE DMA ADDRESS
                        INR     H
                        SHLD    HDADD
                        PUSH    H
                        PUSH    PSW
                WARMRD  LXI     B,RETRIES*100H+Ø ;RETRY COUNTER
                WRMREAD PUSH    B               ;SAVE THE RETRY COUNT
                        CALL    HDREAD          ;READ THE SECTOR
                        POP     B
                        JNC     WARMLOD         ;TEST FOR ERROR
                        DCR     B               ;UPDATE THE ERROR COUNT
                        JNZ     WRMREAD         ;KEEP TRYING IF NOT TO MANY ERRORS
                        HLT                     ;CAN'T WARM BOOT
                        ENDIF

                        IF      (MAXFLOP NE Ø) AND NOT FIRST ;SUPPLY WARM BOOT FROM 2D ?
CECA CD33CD             CALL    DJDRV           ;SELECT DRIVE A
CECD ØE00               MVI     C,Ø             ;SELECT SINGLE DENSITY
CECF CD2DE4             CALL    DJDEN
CED2 ØE00               MVI     C,Ø             ;SELECT SIDE Ø
CED4 CD30E4             CALL    DJSIDE
```

```
CED7 3E0F              MVI     A,15            ;INITIALIZE THE SECTOR TO READ
CED9 32F7CE            STA     NEWSEC
CEDC 2100B6            LXI     H,CCP-100H      ;AND THE DMA ADDRESS
CEDF 2216CF            SHLD    NEWDMA
CEE2 CDF6CE            CALL    WARMLOD         ;READ IN CP/M
CEE5 0100BC            LXI     B,CCP+500H      ;LOAD ADDRESS FOR REST OF WARM BOOT
CEE8 CD12E4            CALL    DJDMA
CEEB 0E08              MVI     C,8
CEED CD0FE4            CALL    DJSEC
CEF0 CD2ACF            CALL    WARMRD
CEF3 C303BC            JMP     CCP+503H

CEF6 3E0F      WARMLOD MVI     A,15            ;PREVIOUS SECTOR
CEF7 =         NEWSEC  EQU     $-1
CEF8 3C                INR     A               ;UPDATE THE PREVIOUS SECTOR
CEF9 3C                INR     A
CEFA FE1B              CPI     27              ;WAS IT THE LAST ?
CEFC DA0ECF            JC      NOWRAP
CEFF D609              SUI     9               ;YES
CF01 FE13              CPI     19
CF03 C8                RZ
CF04 2A16CF            LHLD    NEWDMA
CF07 1180FB            LXI     D,-480H
CF0A 19                DAD     D
CF0B 2216CF            SHLD    NEWDMA
CF0E 32F7CE    NOWRAP  STA     NEWSEC          ;SAVE THE NEW SECTOR TO READ
CF11 4F                MOV     C,A
CF12 CD0FE4            CALL    DJSEC
CF15 2100B6            LXI     H,CCP-100H      ;GET THE PREVIOUS DMA ADDRESS
CF16 =         NEWDMA  EQU     $-2
CF18 110001            LXI     D,100H          ;UPDATE THE DMA ADDRESS
CF1B 19                DAD     D
CF1C 2216CF            SHLD    NEWDMA          ;SAVE THE DMA ADDRESS
CF1F 44                MOV     B,H
CF20 4D                MOV     C,L
CF21 CD12E4            CALL    DJDMA           ;SET THE DMA ADDRESS
CF24 CD2ACF            CALL    WARMRD
CF27 C3F6CE            JMP     WARMLOD

CF2A 01000A    WARMRD  LXI     B,RETRIES*100H+0;MAXIMUM # OF ERRORS
CF2D C5        WRMREAD PUSH    B
CF2E CD0CE4            CALL    DJTRK           ;SET THE TRACK
CF31 CD15E4            CALL    DJREAD          ;READ THE SECTOR
CF34 C1                POP     B
CF35 D0                RNC                     ;CONTINUE IF SUCCESSFUL
CF36 05                DCR     B
CF37 C22DCF            JNZ     WRMREAD         ;KEEP TRYING
CF3A C32AE4            JMP     DJERR
                       ENDIF

                ;*****************************************************************
                ;*                                                               *
                ;* SETSEC JUST SAVES THE DESIRED SECTOR TO SEEK TO UNTIL AN       *
                ;* ACTUAL READ OR WRITE IS ATTEMPTED.                            *
                ;*                                                               *
                ;*****************************************************************
```

```
CF3D 6Ø         SETSEC  MOV     H,B
CF3E 69                 MOV     L,C
CF3F 22F5D4             SHLD    CPMSEC
CF42 C9         DONOP   RET

                ********************************************************************
                *                                                                  *
                * SETDMA SAVES THE DMA ADDRESS FOR THE DATA TRANSFER.              *
                *                                                                  *
                ********************************************************************

CF43 6Ø         SETDMA  MOV     H,B             ;HL <- BC
CF44 69                 MOV     L,C
CF45 22E5DØ             SHLD    CPMDMA          ;CP/M DMA ADDRESS
CF48 C9                 RET

                ********************************************************************
                *                                                                  *
                * HOME IS TRANSLATED INTO A SEEK TO TRACK ZERO.                    *
                *                                                                  *
                ********************************************************************

CF49 ØE ØØ      HOME    MVI     C,Ø             ;TRACK TO SEEK TO

                ********************************************************************
                *                                                                  *
                * SETTRK SAVES THE TRACK # TO SEEK TO. NOTHING IS DONE AT THIS     *
                * POINT, EVERYTHING IS DEFFERED UNTIL A READ OR WRITE.             *
                *                                                                  *
                ********************************************************************

CF4B 79         SETTRK  MOV     A,C             ;A <- TRACK #
CF4C 32F8D4             STA     CPMTRK          ;CP/M TRACK #
CF4F C9                 RET

                ********************************************************************
                *                                                                  *
                * SECTRAN TRANSLATES A LOGICAL SECTOR # INTO A PHYSICAL SECTOR     *
                * #.                                                               *
                *                                                                  *
                ********************************************************************

                        IF      (MAXHD NE Ø) AND (MAXFLOP NE Ø) ;BOTH TYPES ?
CF5Ø 3AF7D4     SECTRAN LDA     CPMDRV          ;GET THE DRIVE NUMBER

                        IF      FIRST
                        CPI     MAXHD*LOGDSK    ;OVER THE # OF HARD DISKS ?
                        JC      TRANHD
                        ELSE
CF53 FE Ø2              CPI     MAXFLOP         ;OVER THE # OF FLOPPIES ?
CF55 D287CF             JNC     TRANHD
                        ENDIF
                        ENDIF

                        IF      (MAXHD EQ Ø) OR (MAXFLOP EQ Ø) ;JUST ONE TYPE ?
```

```
                SECTRAN EQU     $
                        ENDIF

                        IF      MAXFLOP NE Ø    ;FLOPPY TRANSLATION
CF58 Ø3         TRANFP  INX     B
CF59 D5                 PUSH    D               ;SAVE TABLE ADDRESS
CF5A C5                 PUSH    B               ;SAVE SECTOR #
CF5B CD69DØ             CALL    GETDPB          ;GET DPB ADDRESS INTO HL
CF5E 7E                 MOV     A,M             ;GET # OF CP/M SECTORS/TRACK
CF5F B7                 ORA     A               ;CLEAR CARY
CF6Ø 1F                 RAR                     ;DIVIDE BY TWO
CF61 91                 SUB     C
CF62 F5                 PUSH    PSW             ;SAVE ADJUSTED SECTOR
CF63 FA6FCF             JM      SIDETWO
CF66 F1         SIDEA   POP     PSW             ;DISCARD ADJUSTED SECTOR
CF67 C1                 POP     B               ;RESTORE SECTOR REQUESTED
CF68 D1                 POP     D               ;RESTOR ADDRESS OF XLT TABLE
CF69 EB         SIDEONE XCHG                    ;HL <- &(TRANSLATION TABLE)
CF6A Ø9                 DAD     B               ;BC = OFFSET INTO TABLE
CF6B 6E                 MOV     L,M             ;HL <- PHYSICAL SECTOR
CF6C 26ØØ               MVI     H,Ø
CF6E C9                 RET

CF6F Ø1ØFØØ     SIDETWO LXI     B,15            ;OFFSET TO SIDE BIT
CF72 Ø9                 DAD     B
CF73 7E                 MOV     A,M
CF74 E6Ø8               ANI     8               ;TEST FOR DOUBLE SIDED
CF76 CA66CF             JZ      SIDEA           ;MEDIA IS ONLY SINGLE SIDED
CF79 F1                 POP     PSW             ;RETRIEVE ADJUSTED SECTOR
CF7A C1                 POP     B
CF7B 2F                 CMA                     ;MAKE SECTOR REQUEST POSITIVE
CF7C 3C                 INR     A
CF7D 4F                 MOV     C,A             ;MAKE NEW SECTOR THE REQUESTED SECTOR
CF7E D1                 POP     D
CF7F CD69CF             CALL    SIDEONE
CF82 3E8Ø               MVI     A,8ØH           ;SIDE TWO BIT
CF84 B4                 ORA     H               ;       AND SECTOR
CF85 67                 MOV     H,A
CF86 C9                 RET
                        ENDIF

                        IF      MAXHD NE Ø      ;HARD DISK TRANSLATION ROUTINE
CF87 6Ø         TRANHD  MOV     H,B
CF88 69                 MOV     L,C
CF89 23                 INX     H
CF8A C9                 RET
                        ENDIF

                ********************************************************************
                *                                                                  *
                * SETDRV SELECTS THE NEXT DRIVE TO BE USED IN READ/WRITE           *
                * OPERATIONS. IF THE DRIVE HAS NEVER BEEN SELECTED BEFORE, A       *
                * PARAMETER TABLE IS CREATED WHICH CORRECTLY DESCRIBES THE         *
                * DISKETTE CURRENTLY IN THE DRIVE. DISKETTES CAN BE OF FOUR        *
                * DIFFERENT SECTOR SIZES:                                          *
```

```
                *       1) 128 BYTES SINGLE DENSITY.                            *
                *       2) 256 BYTES DOUBLE DENSITY.                            *
                *       3) 512 BYTES DOUBLE DENSITY.                            *
                *       4) 1Ø24 BYTES DOUBLE DENSITY.                           *
                *                                                               *
                *****************************************************************

 CF8B 79        SETDRV  MOV     A,C             ;SAVE THE DRIVE #
 CF8C 32F7D4            STA     CPMDRV
 CF8F FEØ5              CPI     MAXFLOP+(MAXHD*LOGDSK) ;CHECK FOR A VALID DRIVE #
 CF91 D25ADØ            JNC     ZRET            ;ILLEGAL DRIVE #
 CF94 7B                MOV     A,E             ;TEST IF DRIVE EVER LOGGED IN BEFORE
 CF95 E6Ø1              ANI     1
 CF97 C241DØ            JNZ     SETDRV1         ;BIT Ø OF E = Ø -> NEVER SELECTED BEFORE

                        IF      (MAXHD NE Ø) AND (MAXFLOP NE Ø) ;BOTH TYPES ?
 CF9A 3AF7D4            LDA     CPMDRV          ;GET THE DRIVE NUMBER

                        IF      FIRST
                        CPI     MAXHD*LOGDSK    ;OVER THE # OF HARD DISKS ?
                        JC      DRVHD
                        SUI     MAXHD*LOGDSK
                        ELSE
 CF9D FEØ2              CPI     MAXFLOP         ;OVER THE # OF FLOPPIES ?
 CF9F D2F7CF            JNC     SUBFP
                        ENDIF
                        ENDIF

                        IF      (MAXFLOP NE Ø) AND FIRST
                        MOV     C,A             ;SAVE DRIVE #
                        MVI     A,Ø             ;HAVE THE FLOPPIES BEEN ACCESSED YET ?
                FLOPFLG EQU     $-1
                        ANA     A
                        JNZ     FLOPOK
                        MVI     B,17            ;FLOPPIES HAVN'T BEEN ACCESSED
                        LXI     H,DJBOOT        ;CHECK IF 2D CONTROLLER IS INSTALLED
                        MVI     A,(JMP)
                CLOPP   CMP     M
                        JNZ     ZRET
                        DCR     B
                        JNZ     CLOPP
                        CALL    DJBOOT          ;INITIALIZE THE CONTROLLER
                        MVI     A,1             ;SAVE 2D INITIALIZED FLAG
                        STA     FLOPFLG
                        ENDIF
                        IF      MAXFLOP NE Ø
 CFA2 21Ø1ØØ    FLOPOK  LXI     H,1             ;SELECT SECTOR 1 OF TRACK 1
 CFA5 22F9D4            SHLD    TRUESEC
 CFA8 3EØ1              MVI     A,1
 CFAA 32F8D4            STA     CPMTRK
 CFAD CD96D1            CALL    FILL            ;FLUSH BUFFER AND REFILL
 CFBØ DA5ADØ            JC      ZRET            ;TEST FOR ERROR RETURN
 CFB3 CD27E4            CALL    DJSTAT          ;GET STATUS ON CURRENT DRIVE
 CFB6 E6ØC              ANI     ØCH             ;STRIP OFF UNWANTED BITS
 CFB8 F5                PUSH    PSW             ;USED TO SELECT A DPB
 CFB9 1F                RAR
```

```
CFBA 2182DØ             LXI     H,XLTS          ;TABLE OF XLT ADDRESSES
CFBD 5F                 MOV     E,A
CFBE 16ØØ               MVI     D,Ø
CFCØ 19                 DAD     D
CFC1 E5                 PUSH    H               ;SAVE POINTER TO PROPER XLT
CFC2 CD69DØ             CALL    GETDPB          ;GET DPH POINTER INTO DE
CFC5 EB                 XCHG                    ;
CFC6 D1                 POP     D
CFC7 Ø6Ø2               MVI     B,2             ;NUMBER OF BYTES TO MOVE
CFC9 CDCCD1             CALL    MOVLOP          ;MOVE THE ADDRESS OF XLT
CFCC 11Ø8ØØ             LXI     D,8             ;OFFSET TO DPB POINTER
CFCF 19                 DAD     D               ;HL <- &DPH.DPB
CFDØ E5                 PUSH    H
CFD1 2AØ7E0             LHLD    ORIGIN+7        ;GET ADDRESS OF DJ TERMINAL OUT ROUTINE
CFD4 23                 INX     H               ;BUMP TO LOOK AT ADDRESS OF
                                                ;       UART STATUS LOCATION
CFD5 7E                 MOV     A,M
CFD6 EEØ3               XRI     3               ;ADJUST FOR PROPER REV DJ
CFD8 6F                 MOV     L,A
CFD9 26E3               MVI     H,(ORIGIN+3ØØH)/1ØØH
CFDB 7E                 MOV     A,M
CFDC E6Ø8               ANI     DBLSID          ;CHECK DOUBLE SIDED BIT
CFDE 11F5D3             LXI     D,DPB128S       ;BASE FOR SINGLE SIDED DPB'S
CFE1 C2E7CF             JNZ     SIDEOK
CFE4 1135D4             LXI     D,DPB128D       ;BASE OF DOUBLE SIDED DPB'S
CFE7 EB         SIDEOK  XCHG                    ;HL <- DBP BASE, DE <- &DPH.DPB
CFE8 D1                 POP     D               ;RESTORE DE (POINTER INTO DPH)
CFE9 F1                 POP     PSW             ;OFFSET TO CORRECT DPB
CFEA 17                 RAL
CFEB 17                 RAL
CFEC 4F                 MOV     C,A
CFED Ø6ØØ               MVI     B,Ø
CFEF Ø9                 DAD     B
CFFØ EB                 XCHG                    ;PUT DPB ADDRESS IN DPH
CFF1 73                 MOV     M,E
CFF2 23                 INX     H
CFF3 72                 MOV     M,D
                        ENDIF

                        IF      (MAXHD NE Ø) AND (MAXFLOP NE Ø)
CFF4 C341DØ             JMP     SETDRV1         ;SKIP OVER THE HARD DISK SELECT
                        IF      NOT FIRST
CFF7 D6Ø2       SUBFP   SUI     MAXFLOP         ;ADJUST THE DRIVE #
                        ENDIF
                        ENDIF

                        IF      MAXHD NE Ø
CFF9 CD6ØDØ     DRVHD   CALL    DIVLOG          ;DIVIDE BY LOGICAL DISKS PER DRIVE
CFFC 79                 MOV     A,C
CFFD 3222D3             STA     HDDISK
D000 CD1ØD3             CALL    DRVPTR
D003 7E                 MOV     A,M
D004 3C                 INR     A
D005 C241DØ             JNZ     SETDRV1
D008 F6FC               ORI     NULL            ;SELECT DRIVE
D00A D352               OUT     HDFUNC
```

```
D00C 3E05              MVI     A,SCENBL        ;ENABLE THE CONTROLLER
D00E D350              OUT     HDCNTL
D010 0EEF              MVI     C,239           ;WAIT APPROX 2 MINUTES FOR DISK TO READY
D012 210000            LXI     H,0
D015 2B        TDELAY  DCX     H
D016 7C                MOV     A,H
D017 B5                ORA     L
D018 CC5ED0            CZ      DCRC
D01B C8                RZ
D01C DB50              IN      HDSTAT          ;TEST IF READY YET
D01E E620              ANI     DRVRDY
D020 C215D0            JNZ     TDELAY

                       IF      SDELAY
D023 210000            LXI     H,0             ;TIME ONE REVOLUTION OF THE DRIVE
D026 0E40              MVI     C,INDEX
D028 DB50              IN      HDSTAT
D02A A1                ANA     C
D02B 47                MOV     B,A             ;SAVE CURRENT INDEX LEVEL IN B
D02C DB50      INDX1   IN      HDSTAT
D02E A1                ANA     C
D02F B8                CMP     B               ;LOOP UTIL INDEX LEVEL CHANGES
D030 CA2CD0            JZ      INDX1
D033 23        INDX2   INX     H
D034 DB50              IN      HDSTAT          ;START COUNTING UNTIL INDEX RETURNS TO
D036 A1                ANA     C               ;       PREVIOUS STATE
D037 B8                CMP     B
D038 C233D0            JNZ     INDX2
                       IF      M10
                       DAD     H
                       ENDIF
D03B 2208D2            SHLD    SETTLE          ;SAVE THE COUNT FOR TIMEOUT DELAY
                       ENDIF
D03E CDF2D1            CALL    HDHOME
                       ENDIF

D041 CD69D0    SETDRV1 CALL    GETDPB          ;GET ADDRESS OF DPB IN HL
D044 010F00            LXI     B,15            ;OFFSET TO SECTOR SIZE
D047 09                DAD     B
D048 7E                MOV     A,M             ;GET SECTOR SIZE
D049 E607              ANI     7H
D04B 3296D0            STA     SECSIZ
D04E 7E                MOV     A,M
D04F 1F                RAR
D050 1F                RAR
D051 1F                RAR
D052 1F                RAR
D053 E60F              ANI     0FH
D055 32D4D0            STA     SECPSEC
D058 EB                XCHG                    ;HL <- DPH
D059 C9                RET

D05A 210000    ZRET    LXI     H,0             ;SELDRV ERROR EXIT
D05D C9                RET

                       IF      MAXHD NE 0
```

```
D05E ØD        DCRC    DCR     C               ;CONDITIONAL DECREMENT C ROUTINE
D05F C9                RET

D060 ØE00      DIVLOG  MVI     C,Ø
D062 D603      DIVLOGX SUI     LOGDSK
D064 D8                RC
D065 ØC                INR     C
D066 C362D0            JMP     DIVLOGX
                       ENDIF

                       ***************************************************************
                       *                                                             *
                       * GETDPB RETURNS HL POINTING TO THE DPB OF THE CURRENTLY      *
                       * SELECTED DRIVE, DE POINTING TO DPH.                         *
                       *                                                             *
                       ***************************************************************

D069 3AF7D4    GETDPB  LDA     CPMDRV
D06C 6F                MOV     L,A             ;FORM OFFSET
D06D 2600              MVI     H,Ø
D06F 29                DAD     H
D070 29                DAD     H
D071 29                DAD     H
D072 29                DAD     H
D073 11A5D4            LXI     D,DPBASE        ;BASE OF DPH'S
D076 19                DAD     D
D077 E5                PUSH    H               ;SAVE ADDRESS OF DPH
D078 110A00            LXI     D,10            ;OFFSET TO DPB
D07B 19                DAD     D
D07C 7E                MOV     A,M             ;GET LOW BYTE OF DPB ADDRESS
D07D 23                INX     H
D07E 66                MOV     H,M             ;GET LOW BYTE OF DPB
D07F 6F                MOV     L,A
D080 D1                POP     D
D081 C9                RET

                       ***************************************************************
                       *                                                             *
                       * XLTS IS A TABLE OF ADDRESS THAT POINT TO EACH OF THE XLT    *
                       * TABLES FOR EACH SECTOR SIZE.                                *
                       *                                                             *
                       ***************************************************************

                       IF      MAXFLOP NE Ø
D082 27D3      XLTS    DW      XLT128          ;XLT FOR 128 BYTE SECTORS
D084 42D3              DW      XLT256          ;XLT FOR 256 BYTE SECTORS
D086 77D3              DW      XLT512          ;XLT FOR 512 BYTE SECTORS
D088 B4D3              DW      XLT124          ;XLT FOR 1024 BYTE SECTORS
                       ENDIF

                       ***************************************************************
                       *                                                             *
                       * WRITE ROUTINE MOVES DATA FROM MEMORY INTO THE BUFFER. IF THE *
                       * DESIRED CP/M SECTOR IS NOT CONTAINED IN THE DISK BUFFER, THE *
                       * BUFFER IS FIRST FLUSHED TO THE DISK IF IT HAS EVER BEEN     *
                       * WRITTEN INTO, THEN A READ IS PERFORMED INTO THE BUFFER TO GET *
```

```
                ********************************************************************
                * THE DESIRED SECTOR. ONCE THE CORRECT SECTOR IS IN MEMORY, THE *
                * BUFFER WRITTEN INDICATOR IS SET, SO THE BUFFER WILL BE        *
                * FLUSHED, THEN THE DATA IS TRANSFERRED INTO THE BUFFER.        *
                *                                                              *
                ********************************************************************

D08A 79         WRITE   MOV     A,C             ;SAVE WRITE COMMAND TYPE
D08B 32FCD0             STA     WRITTYP
D08E 3E01               MVI     A,1             ;SET WRITE COMMAND
D090 06                 DB      (MVI) OR (B*8)  ;THIS "MVI B" INSTRUCTION  CAUSES
                                                ;       THE FOLLOWING "XRA A" TO
                                                ;       BE SKIPPED OVER.

                ********************************************************************
                *                                                              *
                * READ ROUTINE TO BUFFER DATA FROM THE DISK. IF THE SECTOR      *
                * REQUESTED FROM CP/M IS IN THE BUFFER, THEN THE DATA IS SIMPLY *
                * TRANSFERRED FROM THE BUFFER TO THE DESIRED DMA ADDRESS. IF    *
                * THE BUFFER DOES NOT CONTAIN THE DESIRED SECTOR, THE BUFFER IS *
                * FLUSHED TO THE DISK IF IT HAS EVER BEEN WRITTEN INTO, THEN    *
                * FILLED WITH THE SECTOR FROM THE DISK THAT CONTAINS THE        *
                * DESIRED CP/M SECTOR.                                          *
                *                                                              *
                ********************************************************************

D091 AF         READ    XRA     A               ;SET THE COMMAND TYPE TO READ
D092 32E8D0             STA     RDWR            ;SAVE COMMAND TYPE

                ********************************************************************
                *                                                              *
                * REDWRT CALCULATES THE PHYSICAL SECTOR ON THE DISK THAT        *
                * CONTAINS THE DESIRED CP/M SECTOR, THEN CHECKS IF IT IS THE    *
                * SECTOR CURRENTLY IN THE BUFFER. IF NO MATCH IS MADE, THE      *
                * BUFFER IS FLUSHED IF NECESSARY AND THE CORRECT SECTOR READ    *
                * FROM THE DISK.                                                *
                *                                                              *
                ********************************************************************

D095 0600       REDWRT  MVI     B,0             ;THE 0 IS MODIFIED TO CONTAIN THE LOG2
D096 =          SECSIZ  EQU     $-1             ;       OF THE PHYSICAL SECTOR SIZE/128
                                                ;       ON THE CURRENTLY SELECTED DISK.
D097 2AF5D4             LHLD    CPMSEC          ;GET THE DESIRED CP/M SECTOR #
D09A 7C                 MOV     A,H
D09B E680               ANI     80H             ;SAVE ONLY THE SIDE BIT
D09D 4F                 MOV     C,A             ;REMEMBER THE SIDE
D09E 7C                 MOV     A,H
D09F E67F               ANI     7FH             ;FORGET THE SIDE BIT
D0A1 67                 MOV     H,A
D0A2 2B                 DCX     H               ;TEMPORARY ADJUSTMENT
D0A3 05         DIVLOOP DCR     B               ;UPDATE REPEAT COUNT
D0A4 CAB1D0             JZ      DIVDONE
D0A7 B7                 ORA     A
D0A8 7C                 MOV     A,H
D0A9 1F                 RAR
D0AA 67                 MOV     H,A
D0AB 7D                 MOV     A,L
```

```
D0AC 1F                 RAR                     ;DIVIDE THE CP/M SECTOR # BY THE SIZE
                                                ;       OF THE PHYSICAL SECTORS
D0AD 6F                 MOV     L,A
D0AE C3A3D0             JMP     DIVLOOP         ;
D0B1 23         DIVDONE INX     H
D0B2 7C                 MOV     A,H
D0B3 B1                 ORA     C               ;RESTORE THE SIDE BIT
D0B4 67                 MOV     H,A
D0B5 22F9D4             SHLD    TRUESEC         ;SAVE THE PHYSICAL SECTOR NUMBER
D0B8 21F7D4             LXI     H,CPMDRV        ;POINTER TO DESIRED DRIVE,TRACK, AND SECTOR
D0BB 11FBD4             LXI     D,BUFDRV        ;POINTER TO BUFFER DRIVE,TRACK, AND SECTOR
D0BE 0605               MVI     B,5             ;COUNT LOOP
D0C0 05         DTSLOP  DCR     B               ;TEST IF DONE WITH COMPARE
D0C1 CACFD0             JZ      MOVE            ;YES, MATCH. GO MOVE THE DATA
D0C4 1A                 LDAX    D               ;GET A BYTE TO COMPARE
D0C5 BE                 CMP     M               ;TEST FOR MATCH
D0C6 23                 INX     H               ;BUMP POINTERS TO NEXT DATA ITEM
D0C7 13                 INX     D
D0C8 CAC0D0             JZ      DTSLOP          ;MATCH, CONTINUE TESTING

                ****************************************************************
                *                                                              *
                * DRIVE, TRACK, AND SECTOR DON'T MATCH, FLUSH THE BUFFER IF    *
                * NECESSARY AND THEN REFILL.                                   *
                *                                                              *
                ****************************************************************

D0CB CD96D1             CALL    FILL            ;FILL THE BUFFER WITH CORRECT PHYSICAL SECTOR
D0CE D8                 RC                      ;NO GOOD, RETURN WITH ERROR INDICATION

                ****************************************************************
                *                                                              *
                * MOVE HAS BEEN MODIFIED TO CAUSE EITHER A TRANSFER INTO OR OUT *
                * THE BUFFER.                                                  *
                *                                                              *
                ****************************************************************

D0CF 3AF5D4     MOVE    LDA     CPMSEC          ;GET THE CP/M SECTOR TO TRANSFER
D0D2 3D                 DCR     A               ;ADJUST TO PROPER SECTOR IN BUFFER
D0D3 E600               ANI     0               ;STRIP OFF HIGH ORDERED BITS
D0D4 =          SECPSEC EQU     $-1             ;THE 0 IS MODIFIED TO REPRESENT THE # OF
                                                ;       CP/M SECTORS PER PHYSICAL SECTORS
D0D5 6F                 MOV     L,A             ;PUT INTO HL
D0D6 2600               MVI     H,0
D0D8 29                 DAD     H               ;FORM OFFSET INTO BUFFER
D0D9 29                 DAD     H
D0DA 29                 DAD     H
D0DB 29                 DAD     H
D0DC 29                 DAD     H
D0DD 29                 DAD     H
D0DE 29                 DAD     H
D0DF 11FFD4             LXI     D,BUFFER        ;BEGINNING ADDRESS OF BUFFER
D0E2 19                 DAD     D               ;FORM BEGINNING ADDRESS OF SECTOR TO TRANSFER
D0E3 EB                 XCHG                    ;DE = ADDRESS IN BUFFER
D0E4 210000             LXI     H,0             ;GET DMA ADDRESS, THE 0 IS MODIFIED TO
                                                ;       CONTAIN THE DMA ADDRESS
```

```
D0E5 =          CPMDMA  EQU     $-2
D0E7 3E00               MVI     A,0             ;THE ZERO GETS MODIFIED TO CONTAIN
                                                ;       A ZERO IF A READ, OR A 1 IF WRITE
D0E8 =          RDWR    EQU     $-1
D0E9 A7                 ANA     A               ;TEST WHICH KIND OF OPERATION
D0EA C2F2D0             JNZ     INTO            ;TRANSFER DATA INTO THE BUFFER
D0ED CDCAD1     OUTOF   CALL    MOVER
D0F0 AF                 XRA     A
D0F1 C9                 RET

D0F2 EB         INTO    XCHG                    ;
D0F3 CDCAD1             CALL    MOVER           ;MOVE THE DATA, HL = DESTINATION
                                                ;       DE = SOURCE
D0F6 3E01               MVI     A,1
D0F8 3205D1             STA     BUFWRTN         ;SET BUFFER WRITTEN INTO FLAG
D0FB 3E00               MVI     A,0             ;CHECK FOR DIRECTORY WRITE
D0FC =          WRITTYP EQU     $-1
D0FD 3D                 DCR     A
D0FE 3E00               MVI     A,0
D100 32FCD0             STA     WRITTYP         ;SET NO DIRECTORY WRITE
D103 C0                 RNZ                     ;NO ERROR EXIT

                ***************************************************************
                *                                                             *
                * FLUSH WRITES THE CONTENTS OF THE BUFFER OUT TO THE DISK IF  *
                * IT HAS EVER BEEN WRITTEN INTO.                              *
                *                                                             *
                ***************************************************************

D104 3E00       FLUSH   MVI     A,0             ;THE 0 IS MODIFIED TO REFLECT IF
                                                ;       THE BUFFER HAS BEEN WRITTEN INTO
D105 =          BUFWRTN EQU     $-1
D106 A7                 ANA     A               ;TEST IF WRITTEN INTO
D107 C8                 RZ                      ;NOT WRITTEN, ALL DONE

                        IF      (MAXHD NE 0) AND (MAXFLOP NE 0)
D108 2118E4             LXI     H,DJWRITE       ;WRITE OPERATION FOR DISK JOCKEY
D10B 1192D2             LXI     D,HDWRITE       ;WRITE OPERATION FOR HARD DISK
D10E CDD9D1             CALL    DECIDE
                        ELSE
                        IF      MAXHD NE 0
                        LXI     H,HDWRITE
                        ENDIF
                        IF      MAXFLOP NE 0
                        LXI     H,DJWRITE
                        ENDIF
                        ENDIF

                ***************************************************************
                *                                                             *
                * PREP PREPARES TO READ/WRITE THE DISK. RETRIES ARE ATTEMPTED. *
                * UPON ENTRY, H&L MUST CONTAIN THE READ OR WRITE OPERATION     *
                * ADDRESS.                                                    *
                *                                                             *
                ***************************************************************
```

```
D111 AF        PREP     XRA     A               ;RESET BUFFER WRITTEN FLAG
D112 3205D1             STA     BUFWRTN
D115 2277D1             SHLD    RETRYOP         ;SET UP THE READ/WRITE OPERATION
D118 060A               MVI     B,RETRIES       ;MAXIMUM NUMBER OF RETRIES TO ATTEMPT
D11A C5        RETRYLP  PUSH    B               ;SAVE THE RETRY COUNT
D11B 3AFBD4             LDA     BUFDRV          ;GET DRIVE NUMBER INVOLVED IN THE OPERATION

                        IF      (MAXHD NE 0) AND (MAXFLOP NE 0)
                        IF      FIRST
                        CPI     MAXHD*LOGDSK
                        JC      NOADJST
                        SUI     MAXHD*LOGDSK
                        ELSE
D11E FE02               CPI     MAXFLOP
D120 DA25D1             JC      NOADJST
D123 D602               SUI     MAXFLOP
                        ENDIF

D125 4F        NOADJST  MOV     C,A
D126 2133CD             LXI     H,DJDRV         ;SELECT DRIVE
D129 11E1D1             LXI     D,HDDRV
D12C CDD5D1             CALL    DECIDGO
                        ELSE
                        MOV     C,A
                        IF      MAXHD NE 0
                        CALL    HDDRV
                        ENDIF
                        IF      MAXFLOP NE 0
                        CALL    DJDRV           ;SELECT THE DRIVE
                        ENDIF
                        ENDIF

D12F 3AFCD4             LDA     BUFTRK
D132 A7                 ANA     A               ;TEST FOR TRACK ZERO
D133 4F                 MOV     C,A
D134 C5                 PUSH    B

                        IF      (MAXHD NE 0) AND (MAXFLOP NE 0)
D135 2109E4             LXI     H,DJHOME
D138 11F2D1             LXI     D,HDHOME
D13B CCD5D1             CZ      DECIDGO
                        ELSE
                        IF      MAXHD NE 0
                        CZ      HDHOME
                        ENDIF
                        IF      MAXFLOP NE 0
                        CZ      DJHOME          ;HOME THE DRIVE IF TRACK 0
                        ENDIF
                        ENDIF

D13E C1                 POP     B               ;RESTORE TRACK #

                        IF      (MAXHD NE 0) AND (MAXFLOP NE 0)
D13F 210CE4             LXI     H,DJTRK
D142 1113D2             LXI     D,HDTRK
D145 CDD5D1             CALL    DECIDGO
```

```
                        ELSE
                        IF      MAXHD NE Ø
                        CALL    HDTRK
                        ENDIF
                        IF      MAXFLOP NE Ø
                        CALL    DJTRK           ;SEEK TO PROPER TRACK
                        ENDIF
                        ENDIF

 D148 2AFDD4            LHLD    BUFSEC
 D14B 7C                MOV     A,H             ;GET SECTOR INVOLVED IN OPERATION
 D14C Ø7                RLC                     ;BIT Ø OF A EQUALS SIDE #
 D14D E6Ø1              ANI     1               ;STRIP OFF UNNECESSARY BITS
 D14F 4F                MOV     C,A             ;C <- SIDE #

                        IF      (MAXHD NE Ø) AND (MAXFLOP NE Ø)
 D15Ø 213ØE4            LXI     H,DJSIDE
 D153 113FD2            LXI     D,HDSIDE
 D156 CDD5D1            CALL    DECIDGO
                        ELSE
                        IF      MAXHD NE Ø
                        CALL    HDSIDE
                        ENDIF
                        IF      MAXFLOP NE Ø
                        CALL    DJSIDE          ;SELECT THE SIDE
                        ENDIF
                        ENDIF

 D159 2AFDD4            LHLD    BUFSEC
 D15C 7C                MOV     A,H
 D15D E67F              ANI     7FH             ;STRIP OFF SIDE BIT
 D15F 47                MOV     B,A             ;C <- SECTOR #
 D16Ø 4D                MOV     C,L

                        IF      (MAXHD NE Ø) AND (MAXFLOP NE Ø)
 D161 21ØFE4            LXI     H,DJSEC
 D164 1148D2            LXI     D,HDSEC
 D167 CDD5D1            CALL    DECIDGO
                        ELSE
                        IF      MAXHD NE Ø
                        CALL    HDSEC
                        ENDIF
                        IF      MAXFLOP NE Ø
                        CALL    DJSEC           ;SELECT THE SIDE
                        ENDIF
                        ENDIF

 D16A Ø1FFD4            LXI     B,BUFFER        ;SET THE DMA ADDRESS

                        IF      (MAXHD NE Ø) AND (MAXFLOP NE Ø)
 D16D 2112E4            LXI     H,DJDMA
 D17Ø 113AD2            LXI     D,HDDMA
 D173 CDD5D1            CALL    DECIDGO
                        ELSE
                        IF      MAXHD NE Ø
                        CALL    HDDMA
```

```
                        ENDIF
                        IF      MAXFLOP NE Ø
                        CALL    DJDMA           ;SELECT THE SIDE
                        ENDIF
                        ENDIF

D176 CDØØØØ            CALL    Ø               ;GET OPERATION ADDRESS
D177 =          RETRYOP EQU     $-2
D179 C1                 POP     B               ;RESTORE THE RETRY COUNTER
D17A 3EØØ               MVI     A,Ø             ;NO ERROR EXIT STATUS
D17C DØ                 RNC                     ;RETURN NO ERROR
D17D Ø5                 DCR     B               ;UPDATE THE RETRY COUNTER
D17E 37                 STC                     ;ASSUME RETRY COUNT EXPIRED
D17F 3EFF               MVI     A,ØFFH          ;ERROR RETURN
D181 C8                 RZ
D182 78                 MOV     A,B
D183 FEØ5               CPI     RETRIES/2
D185 C21AD1             JNZ     RETRYLP         ;TRY AGAIN

D188 C5                 PUSH    B
                        IF      (MAXHD NE Ø) AND (MAXFLOP NE Ø)
D189 2109E4             LXI     H,DJHOME
D18C 11F2D1             LXI     D,HDHOME
D18F CDD5D1             CALL    DECIDGO
                        ELSE
                        IF      MAXHD NE Ø
                        CALL    HDHOME
                        ENDIF
                        IF      MAXFLOP NE Ø
                        CALL    DJHOME          ;HOME THE DRIVE IF TRACK Ø
                        ENDIF
                        ENDIF

D192 C1                 POP     B
D193 C31AD1             JMP     RETRYLP

                ;*****************************************************************
                ;*                                                               *
                ;* FILL FILLS THE BUFFER WITH A NEW SECTOR FROM THE DISK.        *
                ;*                                                               *
                ;*****************************************************************

D196 CDØ4D1     FILL    CALL    FLUSH           ;FLUSH BUFFER FIRST
D199 D8                 RC                      ;CHECK FOR ERROR
D19A 11F7D4             LXI     D,CPMDRV        ;UPDATE THE DRIVE, TRACK, AND SECTOR
D19D 21FBD4             LXI     H,BUFDRV
D1AØ Ø6Ø4               MVI     B,4             ;NUMBER OF BYTES TO MOVE
D1A2 CDCCD1             CALL    MOVLOP          ;COPY THE DATA

D1A5 3AE8DØ             LDA     RDWR
D1A8 A7                 ANA     A
D1A9 CABED1             JZ      FREAD
D1AC 3AFCDØ             LDA     WRITTYP
D1AF 3D                 DCR     A
D1BØ 3D                 DCR     A
D1B1 C8                 RZ
```

```
D1B2 CD69D0          CALL    GETDPB
D1B5 110F00          LXI     D,15
D1B8 19              DAD     D
D1B9 7E              MOV     A,M
D1BA E603            ANI     3
D1BC 3D              DCR     A
D1BD C8              RZ

D1BE =         FREAD EQU     $
                     IF      (MAXHD NE 0) AND (MAXFLOP NE 0)
D1BE 2115E4          LXI     H,DJREAD
D1C1 115DD2          LXI     D,HDREAD
D1C4 CDD9D1          CALL    DECIDE
                     ELSE
                     IF      MAXHD NE 0
                     LXI     H,HDREAD
                     ENDIF
                     IF      MAXFLOP NE 0
                     LXI     H,DJREAD        ;SELECT THE SIDE
                     ENDIF
                     ENDIF
D1C7 C311D1          JMP     PREP            ;SELECT DRIVE, TRACK, AND SECTOR.
                                             ;       THEN READ THE BUFFER

                ****************************************************************
                *                                                              *
                * MOVER MOVES 128 BYTES OF DATA. SOURCE POINTER IN DE, DEST    *
                * POINTER IN HL.                                               *
                *                                                              *
                ****************************************************************

D1CA 0680       MOVER   MVI     B,128           ;LENGTH OF TRANSFER
D1CC 1A         MOVLOP  LDAX    D               ;GET A BTE OF SOURCE
D1CD 77                 MOV     M,A             ;MOVE IT
D1CE 13                 INX     D               ;BUMP POINTERS
D1CF 23                 INX     H
D1D0 05                 DCR     B               ;UPDATE COUNTER
D1D1 C2CCD1             JNZ     MOVLOP          ;CONTINUE MOVING UNTIL DONE
D1D4 C9                 RET

                ****************************************************************
                *                                                              *
                * ROUTINES TO DECIDE WHICH CONTROLLER TO USE.                  *
                *                                                              *
                ****************************************************************

                        IF      (MAXHD NE 0) AND (MAXFLOP NE 0)
D1D5 CDD9D1     DECIDGO CALL    DECIDE  ;WHICH CONTROLLER ?
D1D8 E9                 PCHL
                        ENDIF

                        IF      (MAXHD NE 0) AND (MAXFLOP NE 0)
D1D9 3AFBD4     DECIDE  LDA     BUFDRV          ;GET PROPER ROUTINE INTO H&L, BASED
                        IF      FIRST           ;   ON CURRENTLY SELECTED DRIVE
                        CPI     MAXHD*LOGDSK
                        RNC
```

```
                        ELSE
D1DC FE02               CPI     MAXFLOP
D1DE D8                 RC
                        ENDIF
D1DF EB                 XCHG
D1E0 C9                 RET
                        ENDIF

                ;*****************************************************************
                ;*                                                               *
                ;* THE FOLLOWING IS THE EQUIVALENT OF THE LOWEST LEVEL DRIVERS   *
                ;* FOR THE HARD DISK.                                            *
                ;*                                                               *
                ;*****************************************************************

                        IF      MAXHD NE 0
D1E1 79         HDDRV   MOV     A,C             ;SELECT HARD DISK DRIVE
D1E2 CD60D0             CALL    DIVLOG          ;GET THE PHYSICAL DRIVE #
D1E5 79                 MOV     A,C
D1E6 3222D3             STA     HDDISK          ;SELECT THE DRIVE
D1E9 F6FC               ORI     NULL
D1EB D352               OUT     HDFUNC
D1ED 3E0F               MVI     A,WENABL
D1EF D350               OUT     HDCNTL
D1F1 C9                 RET

D1F2 CD10D3     HDHOME  CALL    DRVPTR
D1F5 3600               MVI     M,0             ;SET TRACK TO ZERO
                        IF      SDELAY
D1F7 DB50       STEPO   IN      HDSTAT          ;TEST STATUS
D1F9 E601               ANI     TKZERO          ;AT TRACK ZERO ?
D1FB CA07D2             JZ      DELAY
D1FE 3E01               MVI     A,1
D200 37                 STC
D201 CD27D2             CALL    ACCOK           ;TAKE ONE STEP OUT
D204 C3F7D1             JMP     STEPO

                        ELSE

                        IN      HDSTAT
                        ANI     TKZERO
                        RZ
                        XRA     A
                        JMP     ACCOK
                        ENDIF

                        IF      SDELAY
D207 210000     DELAY   LXI     H,0             ;GET DELAY
D208 =          SETTLE  EQU     $-2
D20A 2B         DELOOP  DCX     H               ;WAIT 20MS
D20B 7C                 MOV     A,H
D20C B5                 ORA     L
D20D 23                 INX     H
D20E 2B                 DCX     H
D20F C20AD2             JNZ     DELOOP
```

```
D212 C9                 RET
                        ENDIF

D213 CD10D3   HDTRK     CALL    DRVPTR          ;GET POINTER TO CURRENT TRACK
D216 5E                 MOV     E,M             ;GET CURRENT TRACK
D217 71                 MOV     M,C             ;UPDATE THE TRACK
D218 7B                 MOV     A,E             ;NEED TO SEEK AT ALL ?
D219 91                 SUB     C
D21A C8                 RZ
D21B 3F                 CMC                     ;GET CARRY INTO DIRECTION
D21C DA21D2             JC      HDTRK2
D21F 2F                 CMA
D220 3C                 INR     A
                        IF      NOT SDELAY
               HDTRK2   JMP     ACCOK
                        ELSE
D221 CD27D2    HDTRK2   CALL    ACCOK
D224 C307D2             JMP     DELAY
                        ENDIF

D227 47        ACCOK    MOV     B,A             ;PREP FOR BUILD
D228 CD1BD3             CALL    BUILD
D22B E6FB      SLOOP    ANI     NSTEP           ;GET STEP PULSE LOW
D22D D352               OUT     HDFUNC          ;OUTPUT LOW STEP LINE
D22F F604               ORI     PSTEP           ;SET STEP LINE HIGH
D231 D352               OUT     HDFUNC          ;OUTPUT HIGH STEP LINE
D233 05                 DCR     B               ;UPDATE REPEAT COUNT
D234 C22BD2             JNZ     SLOOP           ;KEEP GOING THE REQUIRED # OF TRACKS
D237 C340D2             JMP     WSDONE

D23A 60        HDDMA    MOV     H,B             ;SAVE THE DMA ADDRESS
D23B 69                 MOV     L,C
D23C 2277D2             SHLD    HDADD
D23F =         HDSIDE   EQU     $
D23F C9                 RET

D240 DB50      WSDONE   IN      HDSTAT          ;WAIT FOR SEEK COMPLETE TO FINISH
D242 E604               ANI     COMPLT
D244 CA40D2             JZ      WSDONE
D247 C9                 RET

                        IF      M26
D248 3E1F      HDSEC    MVI     A,01FH          ;FOR COMPATIBILITY WITH CBIOS REV 2.3, 2.4
D24A A1                 ANA     C
D24B CC5AD2             CZ      GETSPT
D24E 3200D3             STA     HDSECTR
D251 3EE0               MVI     A,0E0H
D253 A1                 ANA     C
D254 07                 RLC
D255 07                 RLC
D256 07                 RLC
D257 321CD3             STA     HEAD
D25A 3E20      GETSPT   MVI     A,HDSPT
D25C C9                 RET

                        ELSE
```

```
                HDSEC   MOV     A,C
                        CALL    DIVSPT
                        ADI     HDSPT
                        ANA     A
                        CZ      GETSPT
                        STA     HDSECTR
                        MOV     A,C
                        STA     HEAD
                GETSPT  MVI     A,HDSPT
                        DCR     C
                        RET

                DIVSPT  MVI     C,Ø
                DIVSPTX SUI     HDSPT
                        RC
                        INR     C
                        JMP     DIVSPTX
                        ENDIF

D25D CDDBD2     HDREAD  CALL    HDPREP
D26Ø D8                 RC
D261 AF                 XRA     A
D262 D351               OUT     HDCMND
D264 2F                 CMA
D265 D353               OUT     HDDATA
D267 D353               OUT     HDDATA
D269 3EØ1               MVI     A,RSECT         ;READ SECTOR COMMAND
D26B D351               OUT     HDCMND
D26D CDC1D2             CALL    PROCESS
D27Ø D8                 RC
D271 AF                 XRA     A
D272 D351               OUT     HDCMND
D274 Ø68Ø               MVI     B,SECLEN/4
D276 21ØØØØ             LXI     H,Ø
D277 =          HDADD   EQU     $-2
D279 DB53               IN      HDDATA
D27B DB53               IN      HDDATA
D27D DB53       RTLOOP  IN      HDDATA          ;MOVE FOUR BYTES
D27F 77                 MOV     M,A
D28Ø 23                 INX     H
D281 DB53               IN      HDDATA
D283 77                 MOV     M,A
D284 23                 INX     H
D285 DB53               IN      HDDATA
D287 77                 MOV     M,A
D288 23                 INX     H
D289 DB53               IN      HDDATA
D28B 77                 MOV     M,A
D28C 23                 INX     H
D28D Ø5                 DCR     B
D28E C27DD2             JNZ     RTLOOP
D291 C9                 RET

D292 CDDBD2     HDWRITE CALL    HDPREP          ;PREPARE HEADER
D295 D8                 RC
```

```
D296 AF              XRA     A
D297 D351            OUT     HDCMND
D299 2A77D2          LHLD    HDADD
D29C 0680            MVI     B,SECLEN/4
D29E 7E        WTLOOP MOV    A,M             ;MOVE 4 BYTES
D29F D353            OUT     HDDATA
D2A1 23              INX     H
D2A2 7E              MOV     A,M
D2A3 D353            OUT     HDDATA
D2A5 23              INX     H
D2A6 7E              MOV     A,M
D2A7 D353            OUT     HDDATA
D2A9 23              INX     H
D2AA 7E              MOV     A,M
D2AB D353            OUT     HDDATA
D2AD 23              INX     H
D2AE 05              DCR     B
D2AF C29ED2          JNZ     WTLOOP
D2B2 3E05            MVI     A,WSECT         ;ISSUE WRITE SECTOR COMMAND
D2B4 D351            OUT     HDCMND
D2B6 CDC1D2          CALL    PROCESS
D2B9 D8              RC
D2BA 3E10            MVI     A,WFAULT
D2BC A0              ANA     B
D2BD 37              STC
D2BE C8              RZ
D2BF AF              XRA     A
D2C0 C9              RET

D2C1 DB50      PROCESS IN    HDSTAT          ;WAIT FOR COMMAND TO FINISH
D2C3 47              MOV     B,A
D2C4 E602            ANI     OPDONE
D2C6 CAC1D2          JZ      PROCESS
D2C9 3E07            MVI     A,DSKCLK
D2CB D350            OUT     HDCNTL
D2CD DB50            IN      HDSTAT
D2CF E608            ANI     TMOUT           ;TIMED OUT ?
D2D1 37              STC
D2D2 C0              RNZ
D2D3 DB51            IN      HDRESLT
D2D5 E602            ANI     RETRY           ;ANY RETRIES ?
D2D7 37              STC
D2D8 C0              RNZ
D2D9 AF              XRA     A
D2DA C9              RET

D2DB DB50      HDPREP  IN    HDSTAT
D2DD E620            ANI     DRVRDY
D2DF 37              STC
D2E0 C0              RNZ
D2E1 3E08            MVI     A,ISBUFF        ;INITIALIZE POINTER
D2E3 D351            OUT     HDCMND
D2E5 CD1BD3          CALL    BUILD
D2E8 F60C            ORI     0CH
D2EA D352            OUT     HDFUNC
D2EC 3A1CD3          LDA     HEAD
```

```
D2EF D353               OUT     HDDATA          ;FORM HEAD BYTE
D2F1 CD10D3             CALL    DRVPTR
D2F4 7E                 MOV     A,M             ;FORM TRACK BYTE
D2F5 D353               OUT     HDDATA
D2F7 A7                 ANA     A
D2F8 0680               MVI     B,80H
D2FA CAFFD2             JZ      ZKEY
D2FD 0600               MVI     B,0
D2FF 3E00       ZKEY    MVI     A,0             ;FORM SECTOR BYTE
D300 =          HDSECTR EQU     $-1
D301 D353               OUT     HDDATA
D303 78                 MOV     A,B
D304 D353               OUT     HDDATA
D306 3E07               MVI     A,DSKCLK
D308 D350               OUT     HDCNTL
D30A 3E0F               MVI     A,WENABL
D30C D350               OUT     HDCNTL
D30E AF                 XRA     A
D30F C9                 RET

D310 2A22D3     DRVPTR  LHLD    HDDISK
D313 EB                 XCHG
D314 1600               MVI     D,0
D316 2126D3             LXI     H,DRIVES
D319 19                 DAD     D
D31A C9                 RET

D31B 3E00       BUILD   MVI     A,0
D31C =          HEAD    EQU     $-1
D31D 17                 RAL
D31E 17                 RAL
D31F 17                 RAL
D320 17                 RAL
D321 F600               ORI     0
D322 =          HDDISK  EQU     $-1
D323 EEF0               XRI     0F0H
D325 C9                 RET

D326 =          DRIVES  EQU     $
                        REPT    MAXHD
                        DB      0FFH
                        ENDM
D326+FF                 DB      0FFH
                        ENDIF
```

```
*****************************************************************
*                                                               *
* XLT TABLES (SECTOR SKEW TABLES) FOR CP/M 2.0. THESE TABLES    *
* DEFINE THE SECTOR TRANSLATION THAT OCCURS WHEN MAPPING CP/M   *
* SECTORS TO PHYSICAL SECTORS ON THE DISK. THERE IS ONE SKEW    *
* TABLE FOR EACH OF THE POSSIBLE SECTOR SIZES. CURRENTLY THE    *
* TABLES ARE LOCATED ON TRACK 0 SECTORS 6 AND 8. THEY ARE       *
* LOADED INTO MEMORY IN THE CBIOS RAM BY THE COLD BOOT ROUTINE. *
*                                                               *
*****************************************************************
```

```
                        IF      MAXFLOP NE 0
D327 00         XLT128  DB      0
D328 0107 0D13 19       DB      1,7,13,19,25
D32D 0508 1117          DB      5,11,17,23
D331 0309 0F15          DB      3,9,15,21
D335 0208 0E14 1A       DB      2,8,14,20,26
D33A 060C 1218          DB      6,12,18,24
D33E 040A 1016          DB      4,10,16,22

D342 00         XLT256  DB      0
D343 0102 1314 25       DB      1,2,19,20,37,38
D349 0304 1516 27       DB      3,4,21,22,39,40
D34F 0506 1718 29       DB      5,6,23,24,41,42
D355 0708 191A 2B       DB      7,8,25,26,43,44
D35B 090A 1B1C 2D       DB      9,10,27,28,45,46
D361 0B0C 1D1E 2F       DB      11,12,29,30,47,48
D367 0D0E 1F20 31       DB      13,14,31,32,49,50
D36D 0F10 2122 33       DB      15,16,33,34,51,52
D373 1112 2324          DB      17,18,35,36

D377 00         XLT512  DB      0
D378 0102 0304 11       DB      1,2,3,4,17,18,19,20
D380 2122 2324 31       DB      33,34,35,36,49,50,51,52
D388 0506 0708 15       DB      5,6,7,8,21,22,23,24
D390 2526 2728 35       DB      37,38,39,40,53,54,55,56
D398 090A 0B0C 19       DB      9,10,11,12,25,26,27,28
D3A0 292A 2B2C 39       DB      41,42,43,44,57,58,59,60
D3A8 0D0E 0F10 1D       DB      13,14,15,16,29,30,31,32
D3B0 2D2E 2F30          DB      45,46,47,48

D3B4 00         XLT124  DB      0
D3B5 0102 0304 05       DB      1,2,3,4,5,6,7,8
D3BD 191A 1B1C 1D       DB      25,26,27,28,29,30,31,32
D3C5 3132 3334 35       DB      49,50,51,52,53,54,55,56
D3CD 090A 0B0C 0D       DB      9,10,11,12,13,14,15,16
D3D5 2122 2324 25       DB      33,34,35,36,37,38,39,40
D3DD 393A 3B3C 3D       DB      57,58,59,60,61,62,63,64
D3E5 1112 1314 15       DB      17,18,19,20,21,22,23,24
D3ED 292A 2B2C 2D       DB      41,42,43,44,45,46,47,48

                ;*****************************************************************
                ;*                                                               *
                ;* EACH OF THE FOLLOWING TABLES DESCRIBES A DISKETTE WITH THE    *
                ;* SPECIFIED CHARACTERISTICS.                                    *
                ;*                                                               *
                ;*****************************************************************


                ;*****************************************************************
                ;*                                                               *
                ;* THE FOLLOWING DPB DEFINES A  DISKETTE FOR 128 BYTE SECTORS,   *
                ;* SINGLE DENSITY, AND SINGLE SIDED.                             *
                ;*                                                               *
                ;*****************************************************************

D3F5 1A00       DPB128S DW      26              ;CP/M SECTORS/TRACK
```

```
D3F7 03                 DB      3               ;BSH
D3F8 07                 DB      7               ;BLM
D3F9 00                 DB      0               ;EXM
D3FA F200               DW      242             ;DSM
D3FC 3F00               DW      63              ;DRM
D3FE C0                 DB      0C0H            ;AL0
D3FF 00                 DB      0               ;AL1
D400 1000               DW      16              ;CKS
D402 0200               DW      2               ;OFF
D404 01                 DB      1H              ;16*((#CPM SECTORS/PHYSICAL SECTOR) -1) +
                                                ;LOG2(#BYTES PER SECTOR/128) + 1 +
                                                ;8 IF DOUBLE SIDED.

                ****************************************************************
                *                                                              *
                * THE FOLLOWING DPB DEFINES A DISKETTE FOR 256 BYTE SECTORS,   *
                * DOUBLE DENSITY, AND SINGLE SIDED.                            *
                *                                                              *
                ****************************************************************

D405 3400       DPB256S DW      52              ;CP/M SECTORS/TRACK
D407 04                 DB      4               ;BSH
D408 0F                 DB      15              ;BLM
D409 00                 DB      0               ;EXM
D40A F200               DW      242             ;DSM
D40C 7F00               DW      127             ;DRM
D40E C0                 DB      0C0H            ;AL0
D40F 00                 DB      0               ;AL1
D410 2000               DW      32              ;CKS
D412 0200               DW      2               ;OFF
D414 12                 DB      12H             ;16*((#CPM SECTORS/PHYSICAL SECTOR) -1) +
                                                ;LOG2(#BYTES PER SECTOR/128) + 1 +
                                                ;8 IF DOUBLE SIDED.

                ****************************************************************
                *                                                              *
                * THE FOLLOWING DPB DEFINES A DISKETTE AS 512 BYTE SECTORS,    *
                * DOUBLE DENSITY, AND SINGLE SIDED.                            *
                *                                                              *
                ****************************************************************

D415 3C00       DPB512S DW      60              ;CP/M SECTORS/TRACK
D417 04                 DB      4               ;BSH
D418 0F                 DB      15              ;BLM
D419 00                 DB      0               ;EXM
D41A 1801               DW      280             ;DSM
D41C 7F00               DW      127             ;DRM
D41E C0                 DB      0C0H            ;AL0
D41F 00                 DB      0               ;AL1
D420 2000               DW      32              ;CKS
D422 0200               DW      2               ;OFF
D424 33                 DB      33H             ;16*((#CPM SECTORS/PHYSICAL SECTOR) -1) +
                                                ;LOG2(#BYTES PER SECTOR/128) + 1 +
                                                ;8 IF DOUBLE SIDED.

                ****************************************************************
```

```
                ;*****************************************************************
                ;*                                                               *
                ;* THE FOLLOWING DPB DEFINES A DISKETTE AS 1Ø24 BYTE SECTORS,    *
                ;* DOUBLE DENSITY, AND SINGLE SIDED.                             *
                ;*                                                               *
                ;*****************************************************************

D425 4ØØØ       DP1Ø24S DW      64              ;CP/M SECTORS/TRACK
D427 Ø4                 DB      4               ;BSH
D428 ØF                 DB      15              ;BLM
D429 ØØ                 DB      Ø               ;EXM
D42A 2BØ1               DW      299             ;DSM
D42C 7FØØ               DW      127             ;DRM
D42E CØ                 DB      ØC0H            ;AL0
D42F ØØ                 DB      Ø               ;AL1
D43Ø 2ØØØ               DW      32              ;CKS
D432 Ø2ØØ               DW      2               ;OFF
D434 74                 DB      74H             ;16*((#CPM SECTORS/PHYSICAL SECTOR) -1) +
                                                ;LOG2(#BYTES PER SECTOR/128) + 1 +
                                                ;8 IF DOUBLE SIDED.

                ;*****************************************************************
                ;*                                                               *
                ;* THE FOLLOWING DPB DEFINES A DISKETTE FOR 128 BYTE SECTORS,    *
                ;* SINGLE DENSITY, AND DOUBLE SIDED.                             *
                ;*                                                               *
                ;*****************************************************************

D435 34ØØ       DPB128D DW      52              ;CP/M SECTORS/TRACK
D437 Ø4                 DB      4               ;BSH
D438 ØF                 DB      15              ;BLM
D439 Ø1                 DB      1               ;EXM
D43A F2ØØ               DW      242             ;DSM
D43C 7FØØ               DW      127             ;DRM
D43E CØ                 DB      ØC0H            ;AL0
D43F ØØ                 DB      Ø               ;AL1
D44Ø 2ØØØ               DW      32              ;CKS
D442 Ø2ØØ               DW      2               ;OFF
D444 Ø9                 DB      9H

                ;*****************************************************************
                ;*                                                               *
                ;* THE FOLLOWING DPB DEFINES A DISKETTE AS 256 BYTE SECTORS,     *
                ;* DOUBLE DENSITY, AND DOUBLE SIDED.                             *
                ;*                                                               *
                ;*****************************************************************

D445 68ØØ       DPB256D DW      1Ø4             ;CP/M SECTORS/TRACK
D447 Ø4                 DB      4               ;BSH
D448 ØF                 DB      15              ;BLM
D449 ØØ                 DB      Ø               ;EXM
D44A E6Ø1               DW      486             ;DSM
D44C FFØØ               DW      255             ;DRM
D44E FØ                 DB      ØF0H            ;AL0
D44F ØØ                 DB      Ø               ;AL1
D45Ø 4ØØØ               DW      64              ;CKS
D452 Ø2ØØ               DW      2               ;OFF
```

```
D454 1A                 DB      1AH

                ;*****************************************************************
                ;*                                                               *
                ;* THE FOLLOWING DPB DEFINES A DISKETTE AS 512 BYTE SECTORS,     *
                ;* DOUBLE DENSITY, AND DOUBLE SIDED.                             *
                ;*                                                               *
                ;*****************************************************************

D455 7800       DPB512D DW      120             ;CP/M SECTORS/TRACK
D457 04                 DB      4               ;BSH
D458 0F                 DB      15              ;BLM
D459 00                 DB      0               ;EXM
D45A 3102               DW      561             ;DSM
D45C FF00               DW      255             ;DRM
D45E F0                 DB      0F0H            ;AL0
D45F 00                 DB      0               ;AL1
D460 4000               DW      64              ;CKS
D462 0200               DW      2               ;OFF
D464 3B                 DB      3BH

                ;*****************************************************************
                ;*                                                               *
                ;* THE FOLLOWING DPB DEFINES A DISKETTE AS 1024 BYTE SECTORS,    *
                ;* DOUBLE DENSITY, AND DOUBLE SIDED.                             *
                ;*                                                               *
                ;*****************************************************************

D465 8000       DP1024D DW      128             ;CP/M SECTORS/TRACK
D467 04                 DB      4               ;BSH
D468 0F                 DB      15              ;BLM
D469 00                 DB      0               ;EXM
D46A 5702               DW      599             ;DSM
D46C FF00               DW      255             ;DRM
D46E F0                 DB      0F0H            ;AL0
D46F 00                 DB      0               ;AL1
D470 4000               DW      64              ;CKS
D472 0200               DW      2               ;OFF
D474 7C                 DB      7CH
                        ENDIF

                ;*****************************************************************
                ;*                                                               *
                ;* THE FOLLOWING DPB DEFINES A 20 MEGABYTE HARD DISK, WITH 512   *
                ;* BYTE SECTORS.                                                 *
                ;*                                                               *
                ;*****************************************************************

                        IF      MAXHD NE 0
                        IF      M26 NE 0
D475 0004       DPBHD1  DW      1024            ;CP/M SECTORS/TRACK
D477 05                 DB      5               ;BSH
D478 1F                 DB      31              ;BLM
D479 01                 DB      1               ;EXM
D47A B507               DW      1973            ;DSM
D47C FF01               DW      511             ;DRM
```

```
D47E FF                 DB      0FFH            ;AL0
D47F FF                 DB      0FFH            ;AL1
D480 0000               DW      0               ;CKS
D482 0100               DW      1               ;OFF
D484 33                 DB      33H             ;16*((#CPM SECTORS/PHYSICAL SECTOR) -1) +
                                                ;LOG2(#BYTES PER SECTOR/128) + 1 +
                                                ;8 IF DOUBLE SIDED.
D485 0004       DPBHD2  DW      1024            ;CP/M SECTORS/TRACK
D487 05                 DB      5               ;BSH
D488 1F                 DB      31              ;BLM
D489 01                 DB      1               ;EXM
D48A B507               DW      1973            ;DSM
D48C FF01               DW      511             ;DRM
D48E FF                 DB      0FFH            ;AL0
D48F FF                 DB      0FFH            ;AL1
D490 0000               DW      0               ;CKS
D492 4000               DW      64              ;OFF
D494 33                 DB      33H             ;16*((#CPM SECTORS/PHYSICAL SECTOR) -1) +
                                                ;LOG2(#BYTES PER SECTOR/128) + 1 +
                                                ;8 IF DOUBLE SIDED.

D495 0004       DPBHD3  DW      1024            ;CP/M SECTORS/TRACK
D497 05                 DB      5               ;BSH
D498 1F                 DB      31              ;BLM
D499 01                 DB      1               ;EXM
D49A B507               DW      1973            ;DSM
D49C FF01               DW      511             ;DRM
D49E FF                 DB      0FFH            ;AL0
D49F FF                 DB      0FFH            ;AL1
D4A0 0000               DW      0               ;CKS
D4A2 7F00               DW      127             ;OFF
D4A4 33                 DB      33H             ;16*((#CPM SECTORS/PHYSICAL SECTOR) -1) +
                                                ;LOG2(#BYTES PER SECTOR/128) + 1 +
                                                ;8 IF DOUBLE SIDED.
                        ENDIF
                        IF      M10 NE 0
                DPBHD1  DW      336             ;CP/M SECTORS/TRACK
                        DB      5               ;BSH
                        DB      31              ;BLM
                        DB      1               ;EXM
                        DW      1269            ;DSM
                        DW      511             ;DRM
                        DB      0FFH            ;AL0
                        DB      0FFH            ;AL1
                        DW      0               ;CKS
                        DW      1               ;OFF
                        DB      33H             ;16*((#CPM SECTORS/PHYSICAL SECTOR) -1) +
                                                ;LOG2(#BYTES PER SECTOR/128) + 1 +
                                                ;8 IF DOUBLE SIDED.
                DPBHD2  DW      336             ;CP/M SECTORS/TRACK
                        DB      5               ;BSH
                        DB      31              ;BLM
                        DB      1               ;EXM
                        DW      1280            ;DSM
                        DW      511             ;DRM
                        DB      0FFH            ;AL0
```

```
                DB      0FFH            ;AL1
                DW      0               ;CKS
                DW      122             ;OFF
                DB      33H             ;16*((#CPM SECTORS/PHYSICAL SECTOR) -1) +
                                        ;LOG2(#BYTES PER SECTOR/128) + 1 +
                                        ;8 IF DOUBLE SIDED.
                ENDIF
                IF      M20 NE 0
DPBHD1          DW      672             ;CP/M SECTORS/TRACK
                DB      5               ;BSH
                DB      31              ;BLM
                DB      1               ;EXM
                DW      2015            ;DSM
                DW      511             ;DRM
                DB      0FFH            ;AL0
                DB      0FFH            ;AL1
                DW      0               ;CKS
                DW      1               ;OFF
                DB      33H             ;16*((#CPM SECTORS/PHYSICAL SECTOR) -1) +
                                        ;LOG2(#BYTES PER SECTOR/128) + 1 +
                                        ;8 IF DOUBLE SIDED.
DPBHD2          DW      672             ;CP/M SECTORS/TRACK
                DB      5               ;BSH
                DB      31              ;BLM
                DB      1               ;EXM
                DW      2015            ;DSM
                DW      511             ;DRM
                DB      0FFH            ;AL0
                DB      0FFH            ;AL1
                DW      0               ;CKS
                DW      98              ;OFF
                DB      33H             ;16*((#CPM SECTORS/PHYSICAL SECTOR) -1) +
                                        ;LOG2(#BYTES PER SECTOR/128) + 1 +
                                        ;8 IF DOUBLE SIDED.

DPBHD3          DW      672             ;CP/M SECTORS/TRACK
                DB      5               ;BSH
                DB      31              ;BLM
                DB      1               ;EXM
                DW      1028            ;DSM
                DW      511             ;DRM
                DB      0FFH            ;AL0
                DB      0FFH            ;AL1
                DW      0               ;CKS
                DW      195             ;OFF
                DB      33H             ;16*((#CPM SECTORS/PHYSICAL SECTOR) -1) +
                                        ;LOG2(#BYTES PER SECTOR/128) + 1 +
                                        ;8 IF DOUBLE SIDED.
                ENDIF
                ENDIF

;*****************************************************************
;*                                                               *
;* CP/M DISK PARAMETER HEADERS, UNITIALIZED.                     *
;*                                                               *
;*****************************************************************
```

```
                HEADER  MACRO   ND,DPB
                        DW      Ø               ;TRANSLATION TABLE FILLED IN LATER
                        DW      Ø,Ø,Ø           ;SCRATCH
                        DW      DIRBUF          ;DIRECTORY BUFFER
                        DW      DPB             ;DPB FILLED IN LATER
                        DW      CSV&ND          ;DIRECTORY CHECK VECTOR
                        DW      ALV&ND          ;ALLOCATION VECTOR
                        ENDM

D4A5 =          DPBASE  EQU     $
ØØØØ #          DN      SET     Ø
                        IF      FIRST
                        REPT    MAXHD           ;GENERATE HARD DISK DPH'S FOLLOWED
                        HEADER  %DN,DPBHD1      ;       BY FLOPPY DPH'S
                DN      SET     DN+1
                        HEADER  %DN,DPBHD2
                DN      SET     DN+1
                        IF      (M26 NE Ø) OR (M2Ø NE Ø)
                        HEADER  %DN,DPBHD3
                DN      SET     DN+1
                        ENDIF
                        ENDM
                        REPT    MAXFLOP
                        HEADER  %DN,Ø
                DN      SET     DN+1
                        ENDM
                        ELSE
                        REPT    MAXFLOP         ;GENERATE FLOPPY DPH'S FOLLOWED BY
                        HEADER  %DN,Ø           ;       HARD DISK DPH'S
                DN      SET     DN+1
                        ENDM
D4A5+ØØØØ               DW      Ø               ;TRANSLATION TABLE FILLED IN LATER
D4A7+ØØØØØØØØØØ         DW      Ø,Ø,Ø           ;SCRATCH
D4AD+FFD8               DW      DIRBUF          ;DIRECTORY BUFFER
D4AF+ØØØØ               DW      Ø               ;DPB FILLED IN LATER
D4B1+CAD9               DW      CSVØ            ;DIRECTORY CHECK VECTOR
D4B3+7FD9               DW      ALVØ            ;ALLOCATION VECTOR
D4B5+ØØØØ               DW      Ø               ;TRANSLATION TABLE FILLED IN LATER
D4B7+ØØØØØØØØØØ         DW      Ø,Ø,Ø           ;SCRATCH
D4BD+FFD8               DW      DIRBUF          ;DIRECTORY BUFFER
D4BF+ØØØØ               DW      Ø               ;DPB FILLED IN LATER
D4C1+55DA               DW      CSV1            ;DIRECTORY CHECK VECTOR
D4C3+ØADA               DW      ALV1            ;ALLOCATION VECTOR
                        REPT    MAXHD
                        HEADER  %DN,DPBHD1
                DN      SET     DN+1
                        HEADER  %DN,DPBHD2
                DN      SET     DN+1
                        IF      (M26 NE Ø) OR (M2Ø NE Ø)
                        HEADER  %DN,DPBHD3
                DN      SET     DN+1
                        ENDIF
                        ENDM
D4C5+ØØØØ               DW      Ø               ;TRANSLATION TABLE FILLED IN LATER
D4C7+ØØØØØØØØØØ         DW      Ø,Ø,Ø           ;SCRATCH
```

```
D4CD+FFD8               DW      DIRBUF          ;DIRECTORY BUFFER
D4CF+75D4               DW      DPBHD1          ;DPB FILLED IN LATER
D4D1+8CDB               DW      CSV2            ;DIRECTORY CHECK VECTOR
D4D3+95DA               DW      ALV2            ;ALLOCATION VECTOR
D4D5+0000               DW      0               ;TRANSLATION TABLE FILLED IN LATER
D4D7+0000000000         DW      0,0,0           ;SCRATCH
D4DD+FFD8               DW      DIRBUF          ;DIRECTORY BUFFER
D4DF+85D4               DW      DPBHD2          ;DPB FILLED IN LATER
D4E1+83DC               DW      CSV3            ;DIRECTORY CHECK VECTOR
D4E3+8CDB               DW      ALV3            ;ALLOCATION VECTOR
D4E5+0000               DW      0               ;TRANSLATION TABLE FILLED IN LATER
D4E7+0000000000         DW      0,0,0           ;SCRATCH
D4ED+FFD8               DW      DIRBUF          ;DIRECTORY BUFFER
D4EF+95D4               DW      DPBHD3          ;DPB FILLED IN LATER
D4F1+7ADD               DW      CSV4            ;DIRECTORY CHECK VECTOR
D4F3+83DC               DW      ALV4            ;ALLOCATION VECTOR
                        ENDIF

                ;*****************************************************************
                ;*                                                               *
                ;* CBIOS RAM LOCATIONS THAT DON'T NEED INITIALIZATION.           *
                ;*                                                               *
                ;*****************************************************************

D4F5 0000       CPMSEC  DW      0               ;CP/M SECTOR #
D4F7 00         CPMDRV  DB      0               ;CP/M DRIVE #
D4F8 00         CPMTRK  DB      0               ;CP/M TRACK #
D4F9 0000       TRUESEC DW      0               ;DISK JOCKEY SECTOR THAT CONTAINS CP/M SECTOR
D4FB 00         BUFDRV  DB      0               ;DRIVE THAT BUFFER BELONGS TO
D4FC 00         BUFTRK  DB      0               ;TRACK THAT BUFFER BELONGS TO
D4FD 0000       BUFSEC  DW      0               ;SECTOR THAT BUFFER BELONGS TO
D4FF =          BUFFER  EQU     $

                ;*****************************************************************
                ;*                                                               *
                ;* SIGNON MESSAGE OUTPUT DURING COLD BOOT.                       *
                ;*                                                               *
                ;*****************************************************************

                HEXNUM  MACRO   NUM
                        IF      (NUM/16) > 9
                        DB      (NUM/16 AND 0FH) + 'A' - 10
                        ELSE
                        DB      (NUM/16 AND 0FH) + '0'
                        ENDIF
                        IF      (NUM AND 0FH) > 9
                        DB      (NUM AND 0FH) + 'A' - 10
                        ELSE
                        DB      (NUM AND 0FH) + '0'
                        ENDIF
                        ENDM

D4FF 0D0A0A     PROMPT  DB      ACR,ALF,ALF
D502 4D6F72726F         DB      'Morrow Designs '
D511 35                 DB      '0'+MSIZE/10            ;CP/M MEMORY SIZE
D512 36                 DB      '0'+(MSIZE MOD 10)
```

```
D513 4B2043502F         DB      'K CP/M '                       ;CP/M VERSION NUMBER
D51A 32                 DB      CPMREV/10+'0'
D51B 2E                 DB      '.'
D51C 32                 DB      (CPMREV MOD 10)+'0'
D51D 2C20436269         DB      ', Cbios rev '
D529 322E               DB      REVNUM/10+'0','.'               ;CBIOS REVISION NUMBER
D52B 38                 DB      REVNUM MOD 10+'0'
                        IF      MAXHD NE 0
D52C 2E                 DB      '.'
D52D 32                 DB      MREV/10+'0'
D52E 36                 DB      MREV MOD 10+'0'
                        IF      (M10 OR M20) AND SDELAY
                        DB      'M'
                        ENDIF
                        IF      (M10 OR M20) AND NOT SDELAY
                        DB      'F'
                        ENDIF
                        ENDIF
D52F 0D0A               DB      ACR,ALF
D531 466F7220           DB      'For '

                        IF      MAXFLOP NE 0
D535 6120446973         DB      'a Disk Jockey 2D @ '
                        HEXNUM  %(ORIGIN/256)
D548+45                 DB      (224/16 AND 0FH) + 'A' - 10
D549+30                 DB      (224 AND 0FH) + '0'
D54A 30304820           DB      '00H '
                        ENDIF

                        IF      (MAXHD NE 0) AND (MAXFLOP NE 0)
D54E 616E6420           DB      'and '
                        ENDIF

                        IF      MAXHD NE 0
                        IF      MAXHD EQ 1
D552 616E20             DB      'an '
                        ENDIF
                        IF      MAXHD EQ 2
                        DB      'two '
                        ENDIF
                        IF      MAXHD EQ 3
                        DB      'three '
                        ENDIF
                        IF      MAXHD EQ 4
                        DB      'four '
                        ENDIF
                        IF      MREV EQ 10
                        DB      'M10 '
                        ENDIF
                        IF      MREV EQ 20
                        DB      'M20 '
                        ENDIF
                        IF      MREV EQ 26
D555 4D323620           DB      'M26 '
                        ENDIF
D559 6861726420         DB      'hard disk'
```

```
                        IF      MAXHD NE 1
                        DB      's'
                        ENDIF
D562 204020             DB      ' @ '
                        HEXNUM  %HDORG
D565+35                 DB      (80/16 AND 0FH) + '0'
D566+30                 DB      (80 AND 0FH) + '0'
D567 482E               DB      'H.'
                        ENDIF
D569 0D0A               DB      ACR,ALF
D56B 0D0A               DB      ACR,ALF
D56D 2020202020         DB      '       THE W6GO/K6HHD LIST'
D587 0D0A               DB      ACR,ALF
D589 2020202020         DB      '     Electronics Enterprises'
D5A5 0D0A               DB      ACR,ALF
D5A7 2020202020         DB      '      Rio Linda, California'
D5C2 0D0A               DB      ACR,ALF
D5C4 00                 DB      0

                ;*****************************************************************
                ;*                                                               *
                ;* UTILITY ROUTINE TO OUTPUT THE MESSAGE POINTED AT BY H&L,      *
                ;* TERMINATED WITH A NULL.                                       *
                ;*                                                               *
                ;*****************************************************************

D5C5 7E         MESSAGE MOV     A,M             ;GET A CHARACTER OF THE MESSAGE
D5C6 23                 INX     H               ;BUMP TEXT POINTER
D5C7 A7                 ANA     A               ;TEST FOR END
D5C8 C8                 RZ                      ;RETURN IF DONE
D5C9 E5                 PUSH    H               ;SAVE POINTER TO TEXT
D5CA 4F                 MOV     C,A             ;OUTPUT CHARACTER IN C
D5CB CD0CCD             CALL    COUT            ;OUTPUT THE CHARACTER
D5CE E1                 POP     H               ;RESTORE THE POINTER
D5CF C3C5D5             JMP     MESSAGE         ;CONTINUE UNTIL NULL REACHED

                ;*****************************************************************
                ;*                                                               *
                ;* CBOOT IS THE COLD BOOT LOADER. ALL OF CP/M HAS BEEN LOADED IN *
                ;* WHEN CONTROL IS PASSED HERE.                                  *
                ;*                                                               *
                ;*****************************************************************

D5D2 310001     CBOOT   LXI     SP,TPA          ;SET UP STACK

D5D5 3EC0               MVI     A,INTIOBY
D5D7 320300             STA     IOBYTE
D5DA CD30CE             CALL    TINIT           ;INITIALIZE THE TERMINAL

D5DD 21FFD4             LXI     H,PROMPT        ;PREP FOR SENDING SIGNON MESSAGE
D5E0 CDC5D5             CALL    MESSAGE         ;SEND THE PROMPT
D5E3 AF                 XRA     A               ;SELECT DISK A
D5E4 32F7D4             STA     CPMDRV
D5E7 320400             STA     CDISK

                        IF      (MAXFLOP NE 0) AND FIRST
```

```
                        STA     FLOPFLG
                        ENDIF
D5EA 2103CD             LXI     H,BIOS+3
D5ED 2201CD             SHLD    BIOS+1
D5F0 C350CE             JMP     GOCPM

D5F3                    DS      512-($-BUFFER)  ;MAXIMUM SIZE BUFFER FOR 512 BYTE SECTORS

                        IF      MAXFLOP NE 0
D6FF                    DS      512             ;ADDITIONAL SPACE FOR FLOPPIES 1K SECTORS
                        ENDIF

                        IF      (MAXFLOP NE 0) OR (MAXHD NE 0)
D8FF            DIRBUF  DS      128             ;DIRECTORY BUFFER
                        ENDIF

                ALLOC   MACRO   ND,AL,CS
                ALV&ND  DS      AL
                CSV&ND  DS      CS
                        ENDM

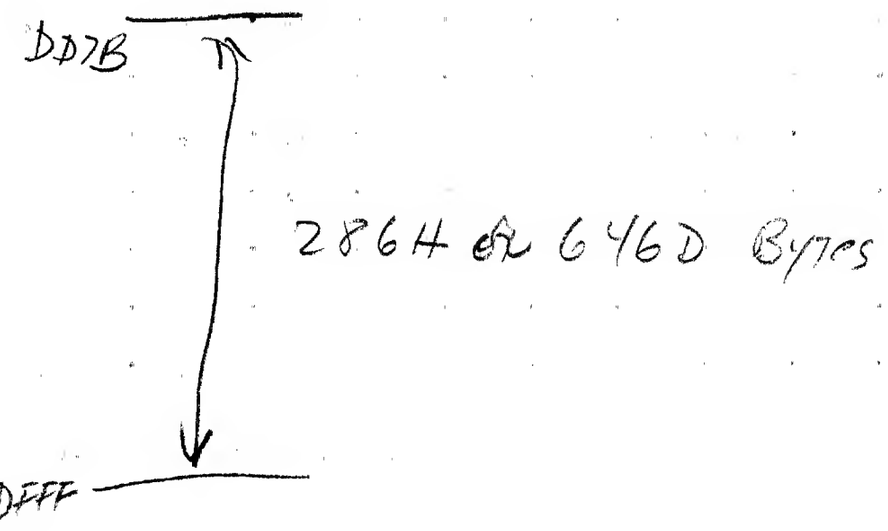
0000 #          DN      SET     0

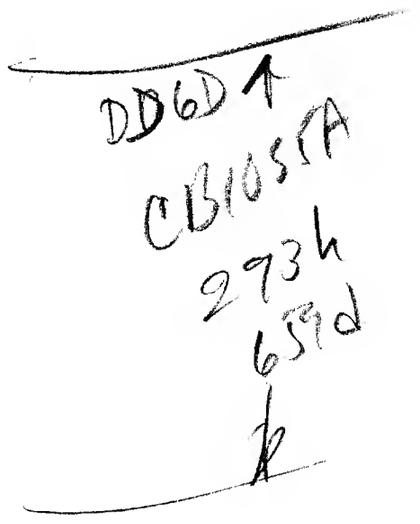
                        IF      NOT FIRST
                        REPT    MAXFLOP
                        ALLOC   %DN,75,64
                DN      SET     DN+1
                        ENDM
D97F+           ALV0    DS      75
D9CA+           CSV0    DS      64
DA0A+           ALV1    DS      75
DA55+           CSV1    DS      64
                        REPT    MAXHD
                        IF      M26 NE 0
                        ALLOC   %DN,247,0
                DN      SET     DN+1
                        ALLOC   %DN,247,0
                DN      SET     DN+1
                        ALLOC   %DN,247,0
                DN      SET     DN+1
                        ENDIF
                        IF      M10 NE 0
                        ALLOC   %DN,159,0
                DN      SET     DN+1
                        ALLOC   %DN,161,0
                DN      SET     DN+1
                        ENDIF
                        IF      M20 NE 0
                        ALLOC   %DN,252,0
                DN      SET     DN+1
                        ALLOC   %DN,252,0
                DN      SET     DN+1
                        ALLOC   %DN,129,0
                DN      SET     DN+1
                        ENDIF
                        ENDM
```

```
DA95+           ALV2    DS      247
DB8C+           CSV2    DS      Ø
DB8C+           ALV3    DS      247
DC83+           CSV3    DS      Ø
DC83+           ALV4    DS      247
DD7A+           CSV4    DS      Ø

                        ELSE

                        REPT    MAXHD
                        IF      M26 NE Ø
                        ALLOC   %DN,247,Ø
                DN      SET     DN+1
                        ALLOC   %DN,247,Ø
                DN      SET     DN+1
                        ALLOC   %DN,247,Ø
                DN      SET     DN+1
                        ENDIF
                        IF      M1Ø NE Ø
                        ALLOC   %DN,159,Ø
                DN      SET     DN+1
                        ALLOC   %DN,161,Ø
                DN      SET     DN+1
                        ENDIF
                        IF      M2Ø NE Ø
                        ALLOC   %DN,252,Ø
                DN      SET     DN+1
                        ALLOC   %DN,252,Ø
                DN      SET     DN+1
                        ALLOC   %DN,129,Ø
                DN      SET     DN+1
                        ENDIF
                        ENDM
                        REPT    MAXFLOP
                        ALLOC   %DN,75,64
                DN      SET     DN+1
                        ENDM
                        ENDIF
DD7A                    END
```





0006 AACK	D227 ACCOK	000D ACR	0003 AETX	000A ALF
D97F ALV0	DA0A ALV1	DA95 ALV2	DB8C ALV3	DC83 ALV4
CEA3 AUTOFLG	BF00 BDOS	9000 BIAS	CD00 BIOS	D4FB BUFDRV
0080 BUFF	D4FF BUFFER	D4FD BUFSEC	D4FC BUFTRK	D105 BUFWRTN
D31B BUILD	D5D2 CBOOT	B700 CCP	0004 CDISK	CE0B CICRT
CE0B CIPTR	CD88 CITBLE	E003 CITTY	CDF6 CIUC1	CE0B CIUR1
CE0B CIUR2	CE9B CLDBOT	CE86 CLDCMND	0019 CLEAR	CDC8 COCRT
CEA4 COLDBEG	CEB2 COLDEND	CDCC COLPT	0004 COMPLT	CD42 CONIN
CD48 CONIN1	CD57 CONOUT	CD36 CONST	CDCC COPTP	CE3E COPTR
CE45 COPTR1	CD90 COTBLE	E006 COTTY	CDD7 COUL1	CDF5 COUNT
CDCC COUP1	CDCC COUP2	CD0C COUT	D0E5 CPMDMA	D4F7 CPMDRV
0016 CPMREV	D4F5 CPMSEC	D4F8 CPMTRK	CE1F CSCRT	CE1F CSPTR
CD3C CSREADR	CDB8 CSRTBLE	CDB0 CSTBLE	CE17 CSTTY	CE02 CSUC1
CE1F CSUR1	CE1F CSUR2	D9CA CSV0	DA55 CSV1	DB8C CSV2
DC83 CSV3	DD7A CSV4	CEA2 CWFLG	0008 DBLSID	D05E DCRC
D1D9 DECIDE	D1D5 DECIDGO	D207 DELAY	D20A DELOOP	D8FF DIRBUF
D0B1 DIVDONE	D060 DIVLOG	D062 DIVLOGX	D0A3 DIVLOOP	E400 DJBOOT
E003 DJCIN	E006 DJCOUT	E42D DJDEN	E412 DJDMA	CD33 DJDRV
E42A DJERR	E409 DJHOME	E400 DJRAM	E415 DJREAD	E40F DJSEC
E41B DJSEL	E430 DJSIDE	E427 DJSTAT	E40C DJTRK	E021 DJTSTAT
E418 DJWRITE	CF42 DONOP	D465 DP1024D	D425 DP1024S	D435 DPB128D
D3F5 DPB128S	D445 DPB256D	D405 DPB256S	D455 DPB512D	D415 DPB512S
D4A5 DPBASE	D475 DPBHD1	D485 DPBHD2	D495 DPBHD3	D326 DRIVES
CFF9 DRVHD	D310 DRVPTR	0020 DRVRDY	0007 DSKCLK	D0C0 DTSLOP
0005 ENTRY	D196 FILL	0000 FIRST	CFA2 FLOPOK	D104 FLUSH
D1BE FREAD	D069 GETDPB	D25A GETSPT	CE50 GOCPM	D277 HDADD
0051 HDCMND	0050 HDCNTL	0053 HDDATA	D322 HDDISK	D23A HDDMA
D1E1 HDDRV	0052 HDFUNC	D1F2 HDHOME	0050 HDORG	D2DB HDPREP
D25D HDREAD	0051 HDRESLT	0004 HDRLEN	D248 HDSEC	D300 HDSECTR
D23F HDSIDE	0020 HDSPT	0050 HDSTAT	D213 HDTRK	D221 HDTRK2
D292 HDWRITE	D31C HEAD	CF49 HOME	0000 IDBUFF	0040 INDEX
D02C INDX1	D033 INDX2	00C0 INTIOBY	D0F2 INTO	0003 IOBYTE
0008 ISBUFF	CD77 LIST	CD7A LIST1	CD82 LISTST	0003 LOGDSK
CE28 LSLPT	CDC0 LSTBLE	CD98 LTBLE	0000 M10	0000 M20
0001 M26	0002 MAXFLOP	0001 MAXHD	00F7 MDIR	D5C5 MESSAGE
D0CF MOVE	D1CA MOVER	D1CC MOVLOP	001A MREV	E800 MSDV
0038 MSIZE	CF16 NEWDMA	CEF7 NEWSEC	D125 NOADJST	CF0E NOWRAP
00FB NSTEP	00FC NULL	5A00 OFFSETC	0002 OPDONE	E000 ORIGIN
D0ED OUTOF	CD72 PNCH1	D111 PREP	D2C1 PROCESS	D4FF PROMPT
0004 PSTEP	CDA0 PTBLE	CD6C PUNCH	CDEC PWAIT	D0E8 RDWR
CD62 READER	D091 READ	CD65 READERA	CD68 READR1	CE2D READY
D095 REDWRT	000A RETRIES	0002 RETRY	D11A RETRYLP	D177 RETRYOP
001C REVNUM	0001 RSECT	CDA8 RTBLE	D27D RTLOOP	0005 SCENBL
0001 SDELAY	0200 SECLEN	D0D4 SECPSEC	D096 SECSIZ	CF50 SECTRAN
CD4C SELDEV	CF43 SETDMA	CF8B SETDRV	D041 SETDRV1	CF3D SETSEC
D208 SETTLE	CF4B SETTRK	CF66 SIDEA	CFE7 SIDEOK	CF69 SIDEONE
CF6F SIDETWO	D22B SLOOP	CE1A STAT	D1F7 STEPO	CFF7 SUBFP
D015 TDELAY	CE30 TINIT	0001 TKZERO	0008 TMOUT	0100 TPA
CF58 TRANFP	CF87 TRANHD	D4F9 TRUESEC	CEB3 WARMBEG	CEB3 WARMEND
CEF6 WARMLOD	CF2A WARMRD	CD03 WBOOTE	CEB4 WBOOT	0000 WBOT
000F WENABL	0010 WFAULT	CEB8 WFLG	000B WRESET	D08A WRITE
D0FC WRITTYP	CF2D WRMREAD	D240 WSDONE	0005 WSECT	D29E WTLOOP
D3B4 XLT124	D327 XLT128	D342 XLT256	D377 XLT512	D082 XLTS
D2FF ZKEY	D05A ZRET			